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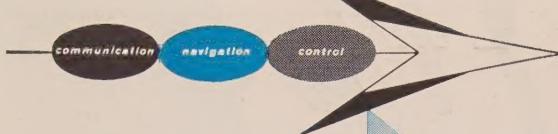


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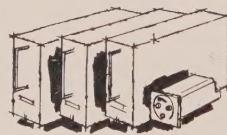


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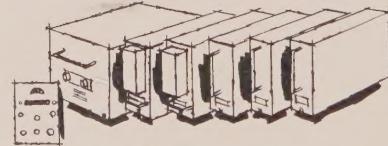
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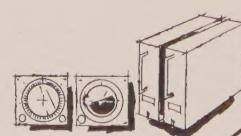
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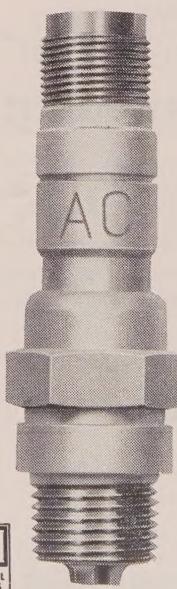
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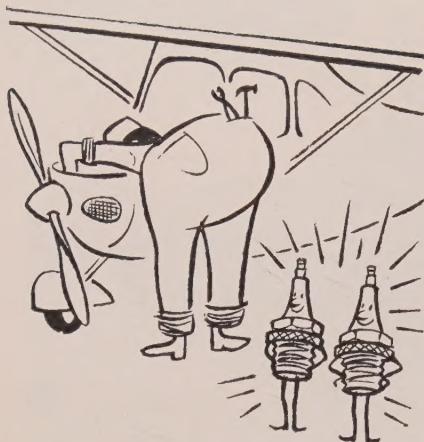


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SEPTEMBER, 1956

skyways

FOR BUSINESS



The official publication of the National Business Aircraft Association

COVER: Downtown Miami, site of the NBAA 9th Annual Forum
Left, Headquarters Hotels, the McAllister and the Columbus;
Center, the Miami Coliseum.

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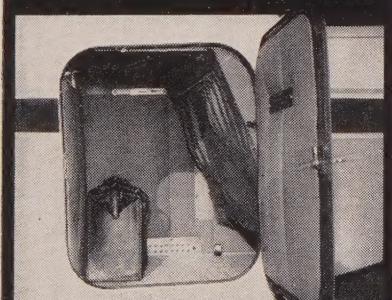
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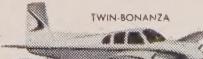
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PERSONNEL

Norman Warren has been elected a Vice-President by the board of Directors of Lear, Inc. **Joseph M. Walsh** was elected Assistant Secretary, **Forrest D. Beamer** Assistant Secretary and Assistant Treasurer.

Robert J. Smith's membership on the Board of Directors of Continental Airlines while retaining presidency of Slick Airways has received CAA approval.

T. Lawrence Cronin, Jr., has been appointed Director of Industrial Relations of Greer Hydraulics, N.Y. **Cecil Barlow** and **Melvin Schoenberg** have been named manufacturing superintendent and planning supervisor respectively.

Herbert L. Weiss has been assigned as supervisor of field service and installation of the auto-pilot produced by Federal Telephone & Radio Co., Clifton, N.J.

Robert J. Geis has been named manager of Beech Aircraft's new north central sales region. **Robert G. Oestreicher** is Beech's new northeastern regional sales manager.

R. B. Springer has been appointed sales manager of the Tactair Div. of Aircraft Products Co., Bridgeport, Pa., to direct marketing of a new business-plane autopilot.

Donald C. Lillis was elected a director of Piasecki Aircraft Corp., Philadelphia.

George Kincaide has been appointed Piper Sales Representative by Atlantic Aviation Service, Wilmington, Del.

Wilson A. Gebhardt has been appointed Section Manager of Aircraft Engine Products section, Bendix Aviation Corp., South Bend. **William J. Kunz, Jr.**, and **Rudolphe Bodemuller** will be assistant engineering managers.

C. O. Osthoff replaces **R. J. Sherwood** as administrative assistant to **R. M. Tonks**, executive V-P and general manager of Aerodex Inc., Miami. **Henry C. Huntress, Jr.**, is new assistant to the plant manager at Aerodex.

Walter C. Ireland has been appointed Eastern Sales Engineer for Kawneer Aircraft Products Div., Niles, Mich.

Darrell G. Smittle has joined Weber Aircraft Corp., Burbank, Cal., as Staff Engineering Supervisor in the Commercial Seating Div.

Paul Jones has been appointed works manager of the Borg & Beck Division of Borg-Warner Corp.; he was previously Utica Plant Manager of Bendix Aviation Corp.

R. H. Rice, V-P and a director of North American Aviation, has been named General Manager of the Los Angeles Div. **R. H. Ruud** has been named Assistant General Manager at Los Angeles.

John K. Cochran has been appointed production manager for the fiber glass div. of Pittsburgh Plate Glass Co., Pittsburgh.

Merwyn A. Kraft to serve as coordinator of research project for CAA by Flight Safety Foundation in the field of physical standards for aviation personnel.

HONORS

Donald W. Douglas Sr. has received the National Defense Transportation Award for 1956. Previous honors to Douglas include Sperry Award on 20th Anniversary of DC-3, Collier Trophy, Guggenheim Medal, U.S. Certificate of Merit, USAF Exceptional Service Award.

COMPANIES

Cessna Aircraft Co., Wichita, sold 1774 units in the first six months of 1956, exceeding its own total sales for 1955 and leading its nearest competitor by more than 500 units. Cessna sales are larger than the combined sales of three other leading manufacturers. For the four leading manufacturers, sales to July 1956 are only some 850 units less than total 1955 sales.

The Garrett Corp.'s wholly owned subsidiary, the **Northill Co.**, L.A., has been merged with **Garrett's Air Cruisers Div.**, Belmar, N.J., to consolidate the management of all Garrett's survival and marine products.

(Continued on page 38)

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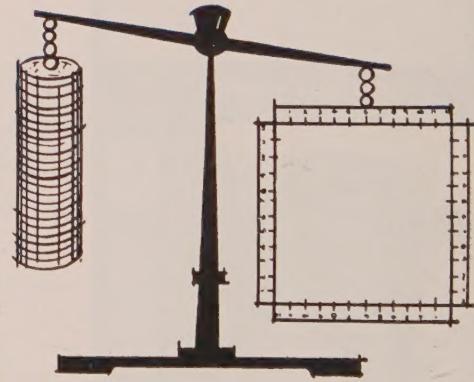


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Editorial

WHY BUSINESS AIRCRAFT?

Some of the reasons that have made and are continuing to make the airplane a recognized industrial tool are, first, that the use of airplanes by American industry has steadily increased as economic justification has become progressively evident. The trial or test period appears to have ended.

Progress in business flying has been evolutionary. It is not a "flash in the pan"; the trends indicate a solid economic base, hence the healthy growth.

Perhaps the fact that for several years industry has been in the process of necessary dispersal and decentralization is the basic economic reason which established industry's need for airplanes. Many large American companies now operate in areas comprising large segments of our country's geography.

It is companies with scattered facilities which have found the airplane of particular value. It is seldom possible, any longer, for management to step from the back door of the headquarters office into the production plant, the storage facility, or the sales outlet. More often than otherwise, these operations are far removed from headquarters.

The American consumer has profited through lower costs by reason of great economies in mass production, which have come as the areas of raw products, of manufacturing processes, and of marketing have been brought under coordinated control.

The need for aircraft in business comes into the picture because the sources of raw products are seldom located near the centers of manufacturing or the areas of consumption.

Key personnel, coordinators, men who must work at many points of operation, such as engineers and other technical people, managers, staff department heads and executives now spend only a fraction of the time in travel that was required before the advent of the business aircraft. Years ago it seemed normal for the key people of industry to spend as much as two or three days in travel time for each productive day on the job. With the airplane, however, this high rate of unproductive travel time has been cut to a fraction. It is not uncommon now to travel to and from and to complete an assignment at a distant point all in one day that formerly required two or three days for travel alone.

Logistics—having the right men, the right tools and the right equipment at the right place at the right time—therefore plays a vital role in the economics of modern business. The airplane accordingly has become a logistics tool of modern business.

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Aircraft Engine service, overhaul, modification, replacement

Propeller service, overhaul, modification, replacement

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SKYWAYS • SEPTEMBER 1956

7



September 1956

Reading, Pa.

Single Engine Operation of Twin Engine Business Aircraft

The conclusions of the Round Table participants included the expression of the following aspects of the situation:

- “The first answer to emergency procedures on the light twins is to start before the emergencies occur.”
- “We have modern airplanes, designed for modern business, and they can handle emergencies very well, given the opportunity.”
- “Our obligation to the customer is to stay with him until he's capable of handling the aircraft through all the emergencies he is likely to meet.”
- “The people who sold me the airplane did all in their power to teach me how to fly it.”
- “It may not be an emergency at all if the man is capable of concise thinking when these things occur.”
- “The airplane is unable to think for itself—a pilot still has to fly it, but aerodynamically we have come a long way to help him.”
- “Given competent, trained handling, the new light twins' performance with one engine out meets all reasonable requirements.”

Thomas A. Davis, Moderator (Chief, General Safety Division, CAA, Region 1): “In opening this Round Table conference, I'd like to express appreciation to SKYWAYS Magazine for their forward-looking policy in conducting these valuable forums for the benefit of the flying public, and especially the business pilots. In this latter group there are pilots whose experience and skill ranges from the newest novice with the ink still wet on his license to the veteran professional who has been flying on his own or somebody else's business for many years.

“Our subject today is a review of single-engine, or ‘one-engine-out’ operation of the new light twins. This is an entirely new class of aircraft coming into the hands of the often non-professional pilot, and the problems associated with them may not be as thoroughly explored as they are with professional pilots and heavier multi-engine aircraft. Mr. Harmon, would you like to start off the discussion?”

Charles Harmon, Jr. (Chief Pilot, Lockport Felt Co.): “I assume that, in this discussion, we're more interested in the new lighter twins rather than the D-18 class. I've found that these aircraft are, at best, marginal as far as single-engine capabilities are concerned, particularly when flown at gross. It's my personal opinion that many of the light twins are being operated over maximum allowable gross, but even at recommended gross loads, inexperienced pilots without a thorough knowledge of twin-engine flying can easily get into serious trouble. These

twins have very good handling characteristics and are simple to fly as long as both engines are operating normally; any pilot can step from a Bonanza, Navion, Cessna, or what have you, into any of these light twins and have no difficulty flying them until they are faced with one-engine-out emergency—and an engine out in aircraft of this category is an emergency.”

Davis: “Mr. Harmon, what would you suggest as a correction in the manufacture of these light twins which might alleviate the conditions you describe, especially on the over-gross question?”

Harmon: “I feel that, basically, the manufacturers are at fault. They are producing an aircraft that they call a twin, but actually to operate it safely and realistically one would almost have to restrict his operation to the same rules he would use if he were using single engine equipment. My point is that they are offering an aircraft that requires technique to fly safely under single engine conditions to a market consisting of pilot whose knowledge of single engine operation of twin-engine equipment is very limited, and in many cases non-existent.”

“Of course, the light twin manufacturers are not the only ones guilty of producing airplanes with a very limited useful load. We are faced with this same problem in most of our aircraft. Starting with a standard craft we are in good shape, but in order to have a piece of equipment that can be utilized safely, one has to load it with dual instrumentation, reliable navigation and communications, dual electri-

cal systems, dual vacuum, adequate fuel, anti-icing, de-icing, etc. By the time a light twin is so equipped, there is no remaining room, weightwise, for passengers. Because of this, we have light twin owners either flying without adequate equipment or well over gross."

Davis: "Do you think that dual equipment should be required on the light twins?"

Harmon: "They should if they're going to fly them as an all-weather airplane, as many of them feel they can."

Davis: "Well, how about emergency procedures on the light twins?"

Harmon: "In answer to Mr. Davis' question, I'd like to express my opinion that the first answer to emergency procedures on the light twins is to start before the emergencies occur. By that I mean with the manufacturer. If he is going to produce and sell equipment that is marginal, he should be morally responsible, through his own representatives, distributors, dealers and salesmen, to see that the people purchasing and flying his product know the shortcomings of that product and how to cope with emergencies. These light twins are very deceiving in performance. With both engines operating, they are a pleasure to handle; but lose an engine, and things become very difficult. Many owners flying light twins have never actually feathered a prop. Many of them have no idea what V-1, V-2, or VMC mean. Many of them don't know what minimum controllable speed is for their plane, nor what effect high temperatures, altitude, or rough air will have on single-engine operation. They don't know because they haven't been told or shown, and in many cases the person demonstrating and selling the aircraft to them doesn't know himself. It's only natural for a business-man, who has been flying single-engine equipment and restricting his operations to day VFR, to think that a light twin will enable him to operate anytime, anywhere, particularly when the light twin seller encourages just such thinking. They feel that with two engines they can fly weather, night, on top, over high terrain with no worries—and they have none, until they lose one of their en-

gines, and then they have problems."

Davis: "Mr. Colthorpe, would you express your opinions?"

Kenneth G. Colthorpe (Chief Pilot, Chamion Spark Plug Co.): "I'd like to endorse Mr. Harmon's remarks, and enlarge on them a little. We are dealing with an industry problem that starts with the people who manufacture the airplane, and their integrity in advertising their product, and then down through the distribution of the product and the demonstration. Often, when it comes to talking about power, speed, stabilized flight conditions, and so on, I've found that the person demonstrating the airplane is not too experienced, and it becomes a case of the blind leading the blind.

"Also, when a manufacturer is talking about standard conditions, he is often talking about ideals. He's not considering all the other variables. For instance, he's obviously talking about new engines, and, of course, non-altitude engines that have age on them are not the same engines they were when you took the demonstration. In the case of a non-altitude engine, maximum performance at altitude will invariably require full throttle, and, all other factors remaining equal, the amount of power developed will decrease as the engine hours increase."

James F. Voyles (Sales Representative, Aero Design and Engineering Co.): "You're talking about normal aspirated engines."

Colthorpe: "That's right. With no compensation for altitude, a full throttle is capable of so much and no more. It will not be the same with six or eight hundred hours on it as it was the day it came out of the factory. These things all wear, and it will show itself sooner or later, in lower horsepower.

"There are many other variables that are not the direct responsibility of the manufacturer. We know that fuels vary. We know that an airplane with a large aggregation of mud on it, for instance, is not going to perform like a clean airplane, and so on. Obviously the man selling the product can't spend even the amount of time we have just spent discussing all these things that are going to keep this airplane in a pinch from doing what he has just said, and

maybe even demonstrated, it would do, to a man who is then going to stake his life that the airplane will do it."

Voyles: "We have to assume that the man has enough intelligence to ascertain these facts himself."

Colthorpe: "Yes, I agree that somewhere along the line we have to limit the responsibility of the manufacturer and distributor. But I would point out this: that if you were running a gun store, and were going to sell a gun to your next-door neighbor, knowing full well that the man does not have the experience to handle it, you might then have cause to consider whether or not you want to make this sale. Obviously, if you're selling an airplane, the chances are that the man may not even be flying in the same state with you, and the law of averages says he isn't going to come through your roof top. We should seriously consider whether or not it's a good chance that he's going to come through somebody's roof top."

"We had a tragic example of it here on the west coast recently, when it was learned during the accident investigation that the man selling an airplane suggested that the buyer take instructions before operating the aircraft. Since the sale was already completed, this suggestion carried little weight. The aircraft ended its last flight buried in an apartment house."

"I think we do have a need for a little more integrity in the distribution of these products, a little more explanation to the man who is undergoing an upgrading into a slightly more advanced aircraft. We should recognize our responsibility at least partially to educate this man to the responsibility he is assuming."

Voyles: "I know one particular manufacturer who has turned down several people because he thought they might possibly kill themselves. But in demonstrating an aircraft to prospective buyers you can't ascertain all these facts soon enough. In our firm, we guarantee all our performance figures within three per cent. You say that a standard atmosphere represents an ideal; the facts are to the contrary. It's taken on a normal day, films are taken of these various tests, and they



ROUND TABLE PARTICIPANTS include (l to r): Charles Harmon, Jr., Chief Pilot for the Lockport Felt Co., Arthur Whitcomb, President of Arthur Whitcomb, Inc., Thomas A. Davis, Chief of CAA's General Safety Division, Region I, Moderator of the Discussion, and R. T. Amis, Jr., President of Aero Design & Engineering Co.



K. G. COLTHORPE, (l), Champion Spark Plug Co., shown here with Edwin S. Braden, owner of Braden's Flying Service, and James F. Voyles, Aero Design and Engineering Co., emphasized the responsibility of the aircraft distributor to ascertain the flying skill of the man buying his first light twin-engine airplane.

are brought down to what are practical, not ideal, conditions.

"As far as the engine goes, of course it will perform well on the first trial. Your automobile will, too. But after you put 50,000 miles on it it becomes a little sluggish, and you take this into consideration before you start on a trip. By the same token, the man you're selling to has enough intelligence to allow the airplane the same leeway as he would his automobile."

Colthorpe: "Mr. Voyles, I think we all agree that the performance of the light twins is satisfactory when everything is functioning. I think our biggest problem has been in the emergencies. Do you think that the aircraft that are now built can handle the emergencies we are likely to meet?"

Voyles: "Yes. In fact, I think they handle them better than any of the pre-war and World War II types. We have modern airplanes, designed for modern business, and they can handle these emergencies very well, given the opportunity.

"However, if you take an inexperienced person and put him in an airplane without properly checking him out—and when I say properly I mean, go through all the single-engine procedures, and all the emergency procedures—you're just waiting for an accident. As long as everything is going fine, the man has no worries. We at Aero Design and Engineering have a training program, and we religiously adhere to it. We request the privilege of checking on every individual who purchases one of our airplanes, even though it's a used aircraft. Just call and we'll be glad to make arrangements for you, send you through our little engineering course, show you all the maintenance, and our chief test pilot will spend the desirable time with you checking you out at no cost to you, the customer, other than the gas and oil."

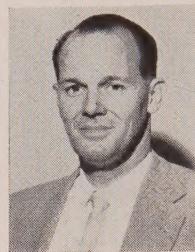
Colthorpe: "Do you find that many of your customers take advantage of it?"

Voyles: "We find that about 99 and nine-tenths per cent take advantage of it, even though they're experienced pilots. Therefore, we get uniform flying of our airplanes throughout the United States, and we have an outstanding safety record."

Davis: "Mr. Braden, you've had a lot of experience in training pilots and their transition into multi-engine. What have you to offer to defend a pilot's point of view in this transition?"

Edwin S. Braden (Owner, Braden's Flying Service): "Well, Tom, I think up until now, when you bought a Twin Beech or a DC-3, no one would think of letting you go without considerable co-pilot time. We come along with these light twins, and everybody's anxious to go, but I think that they just haven't been checked out properly. I think they are fine airplanes; they are built for business today, and they do a good job. Many of them aren't any more loaded down with their equipment than some of the older aircraft that the

ROUND TABLE PARTICIPANTS



THOMAS A. DAVIS, Moderator of the discussion, is Chief of the General Safety Division, CAA Region I. He joined the CAA in 1939; prior to that he spent four years in the Air Force.

R. T. AMIS, JR., is President of the Aero Design and Engineering Co., and is a partner in the Amis Construction Co., which has used business aircraft as a major means of transportation for more than ten years.

EDWIN S. BRADEN has owned and operated Braden's Flying Service since 1934; is distributor for Piper airplanes.

KENNETH G. COLTHORPE, Chief Pilot for Champion Spark Plug Co., active in flying since 1939, has been instructor, ATC pilot, fixed base operator; member AOPA, Air Force Association, QB's; NBAA representative.

CHARLES HARMON, JR., Chief Pilot, Lockport Felt Co., was fixed base operator, A.F. pilot, civilian flight instructor, manager of executive charter operation.

JAMES F. VOYLES, Factory Sales Representative for Aero Design and Engineering Co., has spent 2½ years with that company; previously served ten years as Air Force Pilot.

ARTHUR WHITCOMB is President of Arthur Whitcomb, Inc., owns and operates an Apache.

executive pilots are flying. But these are experienced pilots, and they didn't do it so quickly. We're selling these airplanes to business people, who want to fly them. They step up from a Bonanza or smaller airplane, and they've had very little twin-engine training. I don't think these people are getting the proper check-out or emergency procedures. For instance, we have people come into us, and they'll say, 'How many hours would you say to give me a twin-engine rating?' I can only answer, 'How many hours doesn't come into it. I've got an airplane here that I paid a lot of money for. Do you want to learn to fly this thing or do you just want to go around the field in it?' I think you just can't set any time on the course. Many have said, 'Why, when we learned to fly the Twin-Cessna, the guy only shot three landings with me.' But no one flew a twin Cessna like they're attempting to fly the light twins today. We conceded that their single engine operations were limited, and we operated them with more of a knowledge of their lack of performance than we do today.

"We expect more today, but there is a procedure that must be followed and you've got to be exposed to these things. A fellow says, 'I've got two engines, so if one goes dead I'm much better off.' But I'll never forget that when they checked me out in a Widgeon they said, 'If you lose a motor, you reach out and shut it off. You know what you're going to do—you're going to land.' The old Widgeon had no single-engine performance at all; that's what he was trying to put over.

"We've had many people come to us with other products. I did a flight test recently with a fellow who is going to buy an airplane and who needs some time. I think that some people are turning him loose too soon. I know that before, if you wanted to fly at 18, you'd sit a good many hours as co-pilot, and have a chance to observe these things. But today, it seems that some people think three times around the field are enough. While these multi-engine planes are flying, they'll do an excellent job. There is just a little bit more to know when the emergency does arise. I think we need a good program to check these fellows out, and go through these procedures."

Davis: "Well, Mr. Braden, do you find that the majority of your applicants for multi-engine rating press you for the emergency procedures, or do you have more or less to force them to learn?"

Braden: "We're just not interested in the man who wants to go around the field. I look at it this way: if I give you a multi-engine rating, I can say, 'There's the airplane. It's mine; you can have it and go.' I'm not interested in just saying, 'Well, you flew around the field,' and let it end there. It's got to be a very good course, or there's no sense in wasting the time or the money."

Davis: "Mr. Braden, you sell the light twin?"

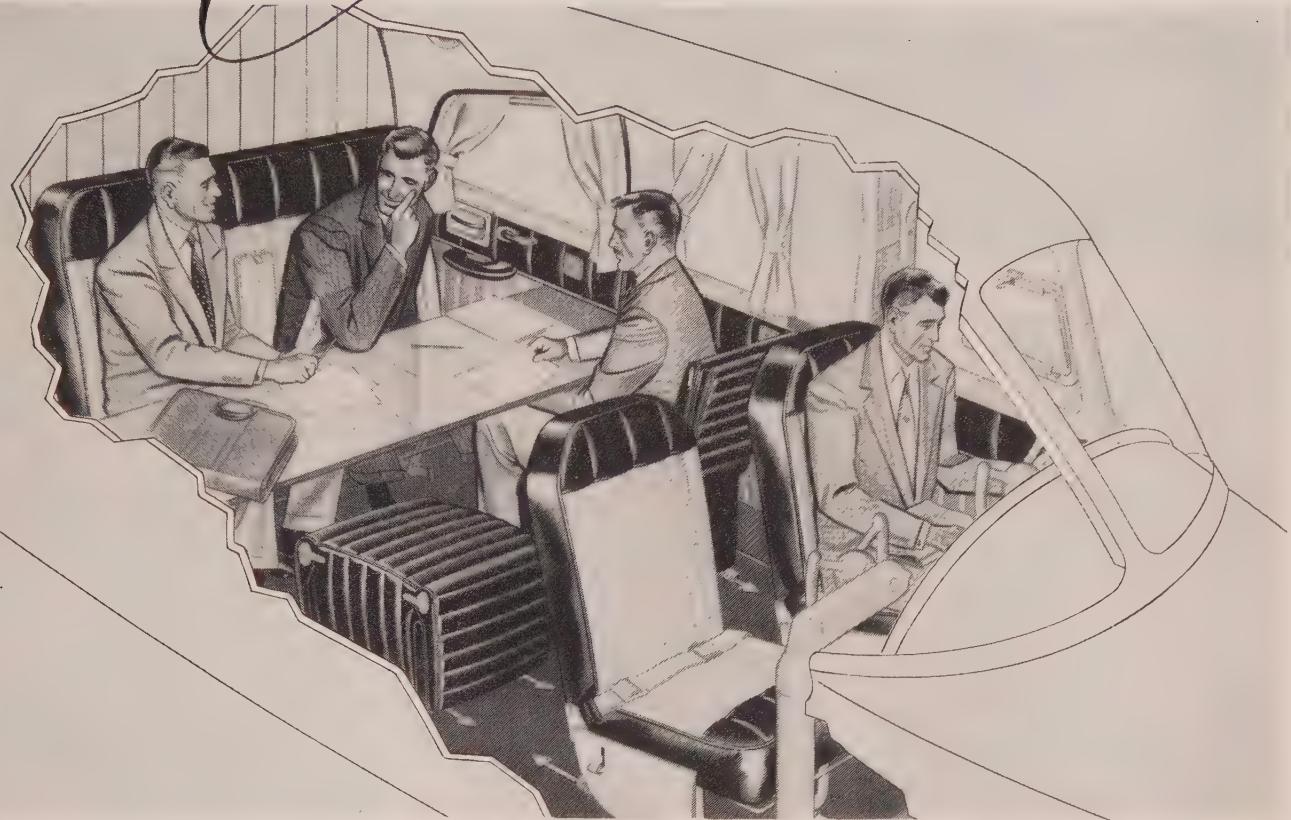
Braden: "Yes."

Davis: "What is your program for indoctrinating the private pilot or the non-professional pilot in its capabilities?"

(Continued on page 30)

IN BOTH GREAT

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New Executive Transport from Cessna: The 620 . . .



Cessna 620 Executive Transport: Four Engines, Pressurization, Air Conditioning, Long Range

Cessna Aircraft Co., Wichita, Kans., Associated Member of NBAA, has produced the first pressurized four-engine airplane ever built expressly for the corporation market, the Model 620. The new executive transport is the result of three years' development, in response to the expressed needs of businessmen for more range, pressurization, air-conditioning, and four-engine safety. Powered by four GSO-526-A Continental engines, each developing 320 hp on takeoff and 290 hp METO, wind tunnel tests indicate a cruising speed of 235 mph at 70% power at 18,000 feet. The 620 will have a maximum speed of 269 mph at 15,000 feet. Take-off gross weight is 13,650 pounds; landing gross is listed at 13,000 pounds. The price of the Cessna 620, production plans and delivery dates will probably be announced about October 1st, following extensive testing and performance evaluation.

Maximum rate of climb at sea level is approximately 1600 feet per minute. Take-off distance, over a 50-foot obstacle at sea level, is 1800 feet, while landing distance over the same obstacle at sea level is approximately 2250 feet. According to Ralph Harmon, Chief Engineer for the 620 project, the four-engine executive transport will have a maximum range of 1700 miles, or over 1550 miles with an average of one hour holding time. Endurance at 65% power will be about 7 1/4 hours. The 620 has a four-engine service ceiling of 27,500 feet at gross weight, and a three-engine service ceiling of 22,500 feet at gross. Harmon said the airplane will comply fully with the CAR 0.4b transport category requirements.

The Cessna 620 has a wing span of 55 feet, a length of 41' 6", and stands 16' 6" high. The wing loading is 40.1 pounds per square foot; power loading is 10.6 pounds per horsepower. By using wing-tip tanks and tanks in the outer wing panels, none of the 620's 535-gallon fuel capacity is carried inboard of the engines.

The fuselage of the 620 is 74" wide and 84" high, permitting full head room. The cabin, which is separated from the pilot's compartment, has 16 x 30 inch picture windows, a galley, located just aft of the pilot's compartment, containing facilities for serving in-flight lunches and hot or cold beverages, a lavatory, located aft of the passenger compartment, and a walk-in, pressurized baggage compartment. A gas turbine power plant, located in the aft fuselage, provides air-conditioning, pressurization, forced ventilation, heating, and auxiliary electrical power. The unit may be operated continuously, in flight or on the ground, thus eliminating the need for outside power sources.

The low wing design of the 620 provides a low center of gravity, with 62% of the gross weight below the passenger compartment, makes the landing gear shorter, and minimizes service difficulties by imposing lower loads on the airplane's primary structure, and increases accessibility of the engines to maintenance crews.

The roomy flight deck of the Cessna 620 has windshield and windows larger than those found in most airline equipment, and the windshield and supporting structure meet CAA bird-proof requirements. De-icing equipment, windshield wipers, windshield anti-icing and defogging make the 620 operable under all weather conditions. The latest safety aids have been incorporated in the layout of cockpit controls and instruments, with a full set of auxiliary instruments and ready access to all radio controls provided for the co-pilot. Secondary instruments and feathering controls are positioned in an overhead panel, and sub-panels contain de-icing and pressurization turbine controls.

Indiana State Airport Map

Copies of the 1956 State Airport Map are now available. All those on the Aero-Notes mailing list will receive a copy. Others interested in obtaining a copy, or of having their names included in the Aero Notes mailing list, should direct their requests to 311 West Washington St., Indianapolis 4.

Illinois Offers Free Radio-Navigation Courses

The State of Illinois Department of Aeronautics "Flight Safety Plan" (safety through education) has been so well received by both pilots and operators, it has been extended to become virtually a regular function of the Safety Section of the Department.

The previous program consisted of Ground School Safety Refresher courses, and questionnaires distributed were returned with a preponderance of requests for a similar program devoted to radio navigation.

Three-hour courses are being conducted through October supplementing the other courses (36 hours total) and notices will be published on airport bulletin boards and carried in the Department's "Special Bulletins" issued and available to all pilots and operators registered with the Department, stating time and places widely distributed throughout the state. Sessions are primarily in the evening. Further information can be obtained from the Department at Capital Airport, Springfield, Illinois.

Aviation Underwriters Pay Claim On Andrea Doria Fatality

A claim of \$100,000, paid by NBAA member Associated Aviation Underwriters for the death of Mrs. Martha Peterson in the Andrea Doria disaster, points up the fact that much of the accident insurance issued by aviation underwriters now provides coverage considerably broader than air insurance alone.

This broader coverage is offered to individuals who do a significant amount of travel by air. Dr. and Mrs. Peterson, who held an annual common carrier passenger accident policy, made the first leg of their journey by air, to Zurich, and continued on a tour through several countries on various other passenger carriers. Although the accident occurred on an ocean liner, Dr. Peterson's claim was answered with a \$100,000 check within hours after it was received.



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Lear Aircraft Engineering Division has engineered more improvements for Lodestars than any other business aircraft center...has qualified more Lodestar improvements for Transport Category certification than any other modification center...has developed and uses more production tooling for Lodestar modifications than any other company...does more Lodestar "8000-hr." overhauls than any other service facility...installs more radar in Lodestars than any other agency...designs and installs more Lodestar cabin furnishings than any other interior specialist...does more Lodestar exterior paint jobs than anyone else. In short, nowhere else can you find so many services or so much Lodestar experience.

Exclusive Lear Improvements

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Fully streamlined, honeycomb-structure radome

Propeller spinners and engine baffles

Wing root fillets

Reinforcement of empennage support structure*

Reinforcement of main landing gear*

Reinforcement of main wing spar*

*MEETS STRUCTURAL REQUIREMENTS FOR 24,000-LB.
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Helicopters for Business . . .

Business Uses for Helicopters Expanding Continually

Increasingly the helicopter is coming into its own as an essential business vehicle. Two entirely different types of organizations—Litton Engineering Laboratories of Grass Valley, Calif., and Miller Aviation Co. of Pittsburgh, offer only a few of hundreds of routine but highly profitable uses to which helicopters can be put.

Charles V. Litton, owner and President of the California firm, employs a Bell 47G-2 helicopter to tie together his diverse interests, which also comprise Litton Industries, 150 miles away, and two ranches, one down in Grass Valley, the other 7000 feet up in the Sierras. Litton says he saves 52 full business days a year, simply by using the helicopter to reach these scattered locations, which are otherwise accessible only via winding, tortuous highways. He's also found his Bell highly effective not only for transportation purposes but also as an agricultural tool, to combat frost damage to his \$45,000-a-year pear orchard. He simply flies low over the orchard, letting his rotor churn the warm upper air down into the groves, thus displacing the cold ground-level air.

Miller Aviation has established Pittsburgh's first downtown heliport for quick-connection transportation to and from the many suburban communities in the mountainous area around the city. Miller also charters his two-passenger Bell helicopters to other business organizations for many different purposes. Owens-Corning Fiberglas Corp recently used one to carry customers and prospective customers on close-up aerial inspections of a brand new Fiberglas "perma-ply" roof it had just installed on a downtown building.



Several oil companies are finding helicopters of great economic value for off-shore drilling operations. Men and materials can be transported to "at sea" platforms in minutes, compared with hours for boats, which are often limited by high seas.

The usability of the helicopter is being continuously improved. The Air Force's Air Research and Development Command reports encouraging progress in development of several devices to enhance helicopter operations. One, for example, is a smoke signal to determine wind conditions, which are always eccentric over irregular terrain, where helicopters are especially useful. ARDC, which is developing this device exclusively for air-rescue purposes, gives no hints as to test results and possible production dates, but since it is equally adaptable to many other business purposes, it will presumably be on the market, possibly in the near future.

business Vertical Take-off airplanes is evident in recent announcements of commercially adaptable military contract awards by Cessna Aircraft Co. and Ryan Aeronautical Company.

Closely following the Kaman Aircraft Corporation move which made the five-place HOK-1 helicopter available as the K-600 to business users, Cessna has now revealed its own plans to market the CH-1A, a new, four-place business helicopter, certificated in April by CAA. It is the successor to the CH-1, which CAA certificated in June, 1955.

According to Frank Martin, Cessna's marketing manager, CH-1A production will begin "in the near future" in anticipation of ultimate commercial sales, probably in 1958—as soon as an initial, limited number have been delivered to the Army for evaluation.

The Cessna version, lighter than Kaman's adaptation, is powered by a 260-hp Continental FSO-470-A and cruises at a 120-mph maximum speed for an effective range of 290 miles, whereas the K-600, with a 600-hp Pratt & Whitney Wasp, has a maximum cruising speed of 95 knots (about 110 mph) and a range of up to 220 miles.

Big Business Potential For Copters and VTOL

Aircraft manufacturers' increasing awareness of the growing market for



Another good example of the adaptability of the helicopter to business operations is the recent acquisition by New York Airways of the first Sikorsky S-58 helicopter released by the military for commercial use. The S-58, intended for the transportation of passengers, mail and cargo in the metropolitan New York area, offers higher load capacity and higher speed than previous equipment, and contributes to New York Airways' exploitation of the helicopter as a necessary adjunct to fixed-wing carrier operations.



PLANE FAX

by STANDARD OIL COMPANY OF CALIFORNIA



De-icing phone lines in the high Cascades

"Just like flying brooms!" That's what telephone men say about the Bell helicopters used to blow heavy frost from long-distance lines in Eastern Washington.

"Before they started using our 'copters," says Carl Brady of Economy Pest Control Company, Yakima, Washington, "men on foot had to try to clean the wires by hitting them with poles. Now, the downdraft from our ships does the whole job in a couple of hours."

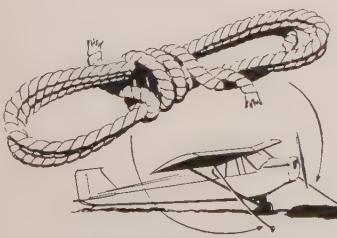
"Flying around those wires can be tricky, but it's just another job to us. We do plenty of tough flying but we've

never had a bad accident. Partly because of Chevron Aviation Gasoline 80/87. We use it in all our craft, and it gives us full power every time we need it. Never fouls plugs, either, and that's really something in a helicopter."

"Because of our government flying, we have to major every 600 hours. But using RPM Aviation Oils, we always take the extra 60 hours we're allowed, and even then the engines are perfectly good when we take them down. From what we've seen, 'RPM' would keep our engines in top shape for 900 hours. It's the best oil we can buy."

TIP OF THE MONTH

High winds with gusts are common this month in many areas. New $\frac{7}{8}$ " manila rope, double-stranded, will make a safe tie-down—don't risk your plane for the sake of an older piece of cordage.



*We take better care
of your plane*

T.M. is "RPM," "CHEVRON," "PLANE FAX," REG. U. S. PAT. OFF.

Ryan's VTOL plane is to be produced under a contract administered for the Army by the Office of Naval Research, and will be known as the "Vertiplane" (not to be confused with the all-jet, high-performance "Vertijet") and is described by T. Claude Ryan, company president, as resembling a conventional lightplane yet capable of true vertical takeoff, or short-run takeoff under heavier loads, maneuverability equal to that of a helicopter but with higher performance in speed, range, altitude and endurance.

Also interesting to note—although it mentions nothing about ultimate business use—is an announcement from Kellett Aircraft Corporation, which reports awards of three military contracts for development of a mechanical, in-flight stabilizing system for large, single-rotor helicopters, one for working out a similar system for tandem-rotor aircraft, and a third for design of a "proprotor"—a device which will combine a forward-thrust propeller with a vertical-lift rotor to increase efficiency of VTOL airplanes.

Copter Shuttle Serves AF Convention

An air taxi shuttle service in a four-place Bell 47J helicopter operated between New Orleans' Moisant International Airport and the downtown area when Air Force Association officials arrived there for their Tenth Annual National Convention. Piloted by Joseph Mashman, Bell's Assistant Director of Contracts, the 47J flew in 12 minutes from the airport to a temporary heliport established a few blocks from the headquarters hotels; ground transportation over the fifteen-mile route otherwise requires between a half hour and an hour.

The Bell 47J, now in production as the Navy HUL-1, is scheduled for commercial sale later this year.

CAA Certifies Helio STOL Seaplane

CAA certification of a float plane model of the Helio Courier, capable of taking off or landing on ponds less than ten times the length of the plane itself, was announced by the Helio Corp., Norwood, Mass. The Helio "STOL" seaplane has a cruising speed of 140 mph and a range of 700 miles.

Seventh Airwork Forum Will Include One-Engine-Out Safety Device

The demonstration of a new safety device for one-engine-out emergencies, and the exhibition of a new business airplane just getting into production, will be features of the Seventh Annual Engine Operation and Maintenance Forum, jointly sponsored by the Airwork Corp. and Pratt & Whitney Aircraft (see Aero Calendar).

Conferences will be devoted to maintenance clinics and demonstration of jet and reciprocating aircraft engines.

Results of Piper Survey

According to an annual survey by Piper Aircraft Corp., Associate Member NBAA, 88% of the "more than several thousand" Tri-Pacer and Apache owners report that their business expansion is directly attributable to commercial use of their airplanes.

Figures from a wide variety of companies and business and professional people reveal that the average Tri-Pacer owner has logged 1681 hours and flies 317 hours a year, while the Apache owner (who more probably holds a commercial license) has logged 4091 hours, adding to this total at a rate of about 505 hours a year in his or his company's Apache.

The survey reveals the following figures for the occupation of Tri-Pacer owners:

19.5%	Manufacturers
10.3%	Ranchers and Farmers
9.1%	Doctors
9.1%	Airport Operators
7.9%	Contractors
5.5%	Wholesalers
3.9%	Real Estate & Insurance
3.6%	Retail Stores
3.6%	Automobile Dealers
3.5%	Salesmen
3.3%	Engineers
2.1%	Oil Field Workers
1.8%	Missionaries and other Church Workers

The remaining 16.8% of Tri-Pacer owners are a diversified group of government agencies, sports pilots, etc.

Apache owners are grouped by occupation as follows:

36.2%	Manufacturers, Executives
13.0%	Contractors
8.7%	Oil Field Workers
5.8%	Real Estate & Insurance
4.3%	Business Distributors
2.9%	Lumbermen
2.9%	Advertising Agencies
1.5%	Airport Operators
1.5%	Dairymen
1.4%	Doctors

As in the case of the Tri-Pacer owners, the remaining 11.8% of Apache owners represent a widely diversified range of interests, including vacation use by executives.

Transistorized Speaker Amplifier

Flitetronics, Inc., Associate Member NBAA, of Burbank, Cal., has made available the first of a line of transistorized aircraft communication and navigation equipment, the CA-3 Speaker Amplifier. The CA-3 is a completely transistorized unit measuring only $2\frac{1}{4} \times 2\frac{3}{4} \times 5\frac{1}{4}$ inches and weighing 1 pound 9 ounces. Despite its compactness, the CA-3 provides 7.5 watts output, continuous and distortion-free.

Basic specifications of the new unit are: 25 db gain, 500 ohm input, frequency response, 300 to 800 cps, 1 dv power supply—28 volts DC, power consumption 1.4 watts idling, 12 watts at full output.

CAA Procedure for Proficiency Test

In Light-Twin Emergency Operation

The problem examined in the Round Table in this issue, the single engine operation of light twin-engine business aircraft, has prompted the issuance of CAA Aviation Safety Release #405, a supplement to Release #400 mentioned in the Round Table, which deals with pilot and flight tests in these aircraft, which have been the source of an increasing number of accidents and critical incidents.

Effective upon the receipt of CAA instructions to its field personnel and pilot examiners, multiengine flight tests will be conducted by Aviation Safety Agents to ensure that pilots will be acquainted with the specific operation minimums characteristic of light twin engine business aircraft. The CAA Safety Release #405 conforms precisely to the conclusion of the Round Table participants that the principal flaw in light-twin-engine efficiency is a lack of pilot proficiency. In order to overcome this inadequacy, the CAA has established tests on the following procedures:

1. Takeoff, landing and normal flight maneuvers, including full stalls in aircraft up to 12,500 pounds and partial stalls in larger aircraft.

2. Flight with one engine inoperative, in which the applicant will be required to demonstrate control loss resulting from excessive reduction of airspeed, and the maintenance of control at minimum control speed when one engine is suddenly throttled.

3. Use of one-engine-out best rate-of-climb speed, in which the applicant should know the best rate-of-climb speed and be able to apply that speed within 5 mph for three minutes.

4. One-engine-out maneuvering, which will involve twenty- to thirty-degree turns toward and away from the inoperative engine.

5. Effect of airplane configuration, such as extending and retracting landing gear and flaps, in which the applicant should maintain the prescribed airspeed within 5 mph through various changes in configuration.

6. One-engine-out approach and landing, in which the applicant must maintain airspeed at least 5 mph above minimum control speed and complete a smooth landing to a full stop.

7. The emergency operation of gear, flaps and accessories.

Flying Tigers Buy Air Cargo Stock

The Flying Tigers, one of the oldest and largest of all-cargo carriers, have purchased stock in Air Cargo, Inc., which operates as a ground service organization for the scheduled airlines in connection with their transportation of property, particularly freight. The Flying Tigers are the 27th scheduled airline to become a member of the group.

Fairchild F-27 Now in Executive Picture . . .



Fairchild F-27 Turboprop Executive Shows Steady Gain in Popularity

Sales to the executive market of the F-27 twin turboprop transport, produced by NBAA member Fairchild Engine and Airplane Corp., have been increasing steadily. As the first propjet aircraft designed for the executive market, the F-27 provides the speed, comfort and range sought after by the corporations in multi-engine equipment. The General Tire and Rubber Co. was the first to order an F-27, and an order was more recently received from Continental Can Co.

The Fairchild F-27 has a cruising speed of over 280 mph, and a range of 2250 miles. It is pressurized, and can operate into comparatively small fields.

Like the airline model, the executive version sells for \$540,000. The executive user must install his own interior, but the executive model has a greater fuel capacity, to provide the executive with greater range than local airline services would require.

The Fairchild F-27 will be displayed at the NBAA Forum, Miami, October 23-25.

Taylorcraft Acquires Rights to "Airphibian" Roadable Plane

Taylorcraft, Inc., Conway, Pa., has acquired the assets of Continental, Inc., Danbury, Conn., and with them the work-in-progress, engineering, drawings, tools, dies, jigs and fixtures of the Fulton "Airphibian," a revolutionary aircraft-automobile combination reported to be the only one of its kind to be approved by the CAA.

The Taylorcraft acquisition was motivated by the conviction that roadability may become an increasingly important aspect in full utilization of small business aircraft. No immediate production plans were announced, however.

Airspotting Relieves Auto Traffic Congestion

A frequently discussed idea whereby airplanes can help relieve, and in many cases actually prevent highway traffic congestion in almost any metropolitan area in the U. S. is already being developed with increasing success by at least two East-coast operators—Atlantic Aviation Service of New Castle County Airport, Del., and Speed's Flying Service of New York.

Working closely with local standard-broadcast radio stations and American Automobile Association experts, the two operators have been sending airplanes aloft to circle high-density traffic areas. Each plane carries an AAA traffic analyst, who observes developing traffic jams and Sunday-driver bottlenecks, spots alternate routes around them, then transmits this bird's-eye information directly by special radio to the broadcasting station for relay to motorists at half-hour intervals.

The radio facilities, according to Atlantic Aviation's Executive Vice President Stewart Ayton, are 31 Motorola FM mobile type transmitters and receivers operating over a 153.11-mg frequency. Atlantic works with Station WIP in Philadelphia while the Speed airplane transmits to the AAA station in New York City, which then re-transmits the information to all regular commercial stations, which broadcast this information as a public service.



Presentation of Safety Awards To Highlight NBAA Miami Forum

Highlighting the three-day annual meeting and forum of the National Business Aircraft Association in Miami, Florida, October 23-24-25, will be the presentation of the Annual Safety Awards to NBAA member organizations and first pilots with outstanding safety records in business flying.

Since 1953, when the awards were first made, through 1955, 60 NBAA member organizations have received honors for operation covering 121,948,670 miles of accident-free business flying.

One hundred and sixty-five business pilots have been honored for their 186,448,370 accident-free miles of operation. Fifteen of these business pilots received special recognition for having flown over 1,000,000 miles without accident involving damage to property or injury to persons. Chairman of the NBAA Annual Safety Awards Committee for 1956 is Vic Swanson, Chief Pilot, Sears, Roebuck & Co. of Chicago.

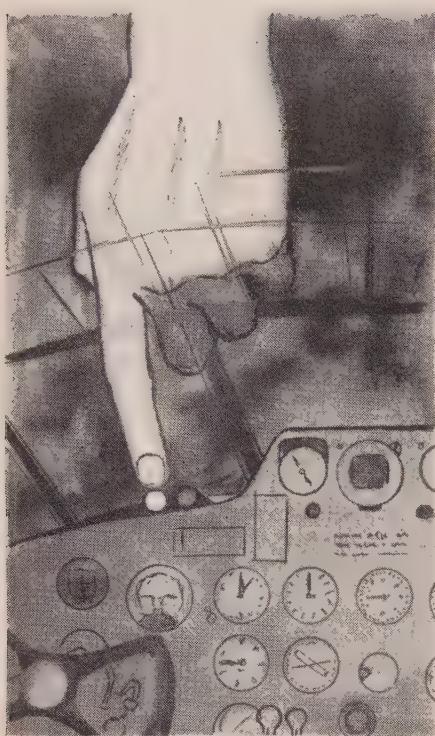
"Applications for the 1956 Safety Awards," Mr. Swanson said, "are still being received from NBAA members. I take this opportunity through SKYWAYS of reminding all of the NBAA membership that the deadline for mailing their applications for Safety Award consideration is September 15th."

Business Planes Prove Value In Florida Forest Service Duties

Because of the effectiveness of aircraft in spotting fires and directing the work of fire-fighters during the winter and spring of 1955, Florida's worst forest-fire season in 27 years, the Florida Forest Service has taken delivery of four 150-hp Super Cubs from Piper Aircraft, NBAA Associate Member.

Intended primarily for service in forest fire detection, "smoke sorting" aerial reconnaissance, and for the issuance of directions to fire fighters via two-way radio, the Forest Service Cubs will also be used for law enforcement work and, in the summer, when rainfall minimizes the forest-fire problem, for air surveys of insect and disease damage to large timber tracts. The Florida Forest Service keeps a fire-watch on more than 15 million acres of commercial timberland.

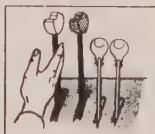
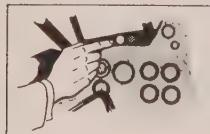
Aircraft perform functions for the Florida Forest Service that would be impossible by any other means. They maintain fire protection when weather conditions reduce visibility from spotting towers; they enable rangers to judge the size and severity of fires when smoke and flames prevent any such estimate from the ground; and Forest Service pilots have spotted arsonists in action who otherwise would have been miles away, the damage already done, before rangers spotted such a critical situation.



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... in the business hangar

■ Reading Aviation Service, Reading, Pa., is installing Bendix C-band radar in C & O Railroad's DC-3, as well as autosyn type of fuel and oil pressure instruments and cabin modifications. □ Stan Siggins, of Plymouth Oil Co., Pittsburgh, brought their DC-3 to Reading for major radio modification and installation of Bendix X-band weather radar. When completed, this airplane will be completely rewired and a new instrument and edge-lighted radio control panel will be installed. □ Stackpole Carbon Co., St. Marys, Pa., brought their new 680 Aero Commander to Reading Aviation Service for installation of the following: dual Collins omni with the Integrated Flight System; Collins 17L-4-51X communications system; Collins Marker Beacon and Glide Path Receivers; dual ARC ADF-21; and the Lear L-2 autopilot with Altitude Control. This installation will make Stackpole's 680 one of the best-equipped Aero Commanders. □ Reading Aviation Service also completed the installation of RCA C-band radar in three Super DC-3's belonging to U. S. Steel, Pittsburgh. Installation incorporated the Chamberlain radome. □ Mine Safety Appliance Co., Pittsburgh, brought their newly acquired DC-3 to Reading for major radio installation, including: Collins Integrated Flight System; Collins omni; DME; Collins Marker Beacon and Glide Slope Receivers; dual ADF; Sperry Gyrosyn system; and a new plastic edge-lighted instrument and radio panel. The airplane was delivered to Reading by Capt. M. L. Nicholson, Mine Safety's NBAA representative.

■ Remmert-Werner, St. Louis, has completed conversion of a DC-3 for Kern County Land Co., San Francisco. The DC-3 will accommodate 14 in an executive interior complete with desks and standard office electrical facilities. Equipment also includes: Collins 17L6 360-channel VHF transmitter; three Bendix MN85 280-channel VHF omni receivers with dual radio magnetic indicators; dual Bendix ADF radio compasses; Sperry H6B electric gyro horizon; Dare 22-channel standby receiver; Collins 51V2 glide slope and 51Z marker; Isolation Amplifier; SAE lighted custom dual instrumentation; and edge-lighted Lucite radio and switch panels. James W. Gray will be Chief Pilot of the new plane, and Harvey Rand Co-pilot. □ Sinclair Refining Co. has taken delivery of a new custom Beech D-18 completed by Remmert-Werner at the Toledo plant. Sinclair Pilot Robert Dunfee worked with R-W to insure the incorporation of all Sinclair requirements. □ Annual relicensing, 1000-hour inspection and landing gear overhaul were completed by R-W on the Chemstrand Lodestar, flown in by Bob Hinds and Ron Breckenridge. □ Ed Elliott brought the Goodyear Aircraft DC-3 to R-W for center section attach angle modification. □ Harry Dawson brought the Rockwell Spring and Axel DC-3 to R-W, Toledo, for installation of Bendix X-band radar with terrain mapping and Racon beacon.

■ Garrett Corp.'s AiResearch Div., Los Angeles, has installed an electrically heated windshield, $\frac{1}{2}$ " thick, with its own power system, designed to protect against breakage in bird/plane collisions, on a DC-3 owned by Libby-Owens-Ford Glass Co. Windshield was part of conversion including enlargement of all cabin windows, installation of two 1830-75 P&W engines, latest electronic equipment, business interior, exterior painting and 8000-hour overhaul. □ Modifications of National Cash Register Co.'s second DC-3 for business flying was recently completed by AiResearch. Up-to-date radio, navigation, communications and instrument systems were installed, including RCA AVQ-10 radar. Major overhaul and rewiring of craft were completed, gross weight increased to 26,900 pounds, and a tri-color paint scheme applied to the exterior. □ AiResearch has serviced two Convair 340's belonging to American Can Co. and Phillips Petroleum Co., installing RCA AVQ-10 radar and the Convair 440 sound performance (exhaust muffler) kit in each. American Can Co.'s plane also received annual inspection.

■ Lear Aircraft Engineering Div., Santa Monica, is installing Bendix X-band radar and Learstar-type rudder spring tab system in the U. S. Steel Lodestar, Don Teel, Pilot; also a repainting of the exterior. □ Chief Pilot Al Franks and Co-pilot Pat Patterson has the C. B. Wrightsman Mark I Learstar at Lear AED for installation of a radome deicer boot prior to departure for Switzerland via New York and Gander. □ Johnson & Johnson's DC-3 is at Lear AED for installation of Lear L-5 autopilot system, complete exterior repainting, Bendix X-band radar, interior modifications, Janitrol heater, dual RMI, omnimap, C-4A compass, and new custom instrument panel. Bob Darnall is Johnson & Johnson's Chief Pilot. □ The first of Columbia-Geneva Steel's two Lodestars has arrived at Lear AED for installation of Learstar-type rudder spring tabs; Roy Rollo is C-G's Chief Pilot.

■ Dallas Aero Service, Dallas, has installed augmentors, Janitrol heaters and an auxiliary fuel tank in the Capple-McDonald deHavilland Dove. Pilot Jim Hendorf flew the plane to Dallas from Grosse Point, and while at Dallas a single engine change, top overhaul, repainting and other work was also completed on the Dove. □ A 100-hour inspection on the Olin Mathieson Co.'s

(Continued on page 43)

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driving*



STUDENTS gain confidence quickly when they see how easy this plane is to "drive." No problems holding it on runway. Built-in protection against "nosing over," ground looping.

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landing gear does it. Extra-wide span, with strong, steerable nose wheel and engineered to lower the center of gravity...it all but eliminates danger from common take-off and landing errors. Big Paralift flaps, the stability of high-wing design contribute

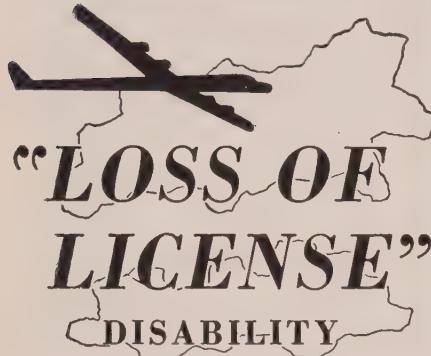
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New Twin Beech . . .



New Twin Added to Beech Line

The Beechcraft Badger, a four-place twin-engine executive airplane with a cruising speed of approximately 200 mph, powered by two 180-hp Lycoming engines, has been announced by Beech Aircraft Corp., Wichita, Kans., NBAA Associate Member, after successful initial flight tests on August 6th. Efforts are being made to assure deliveries early in 1957.

The new Badger is intended for the "\$35,000 to \$55,000 price range," and in the Beech lineup stands between the single-engine Bonanza and the Twin Bonanza. Complete specifications, performance data and delivery information will be revealed later.

Business Aviation Safety Object of New CAA Industry Liaison Staff

An Industry and Interagency Liaison Staff, devoted principally to the aviation safety aspects of executive, industrial and agricultural flying, has been established in CAA's Office of Aviation Safety, under the direction of Wiley R. Wright, former head of the General Aviation Staff in the Office of the Assistant Administrator for Planning, Research and Development.

The duties of Mr. Wright and his assistant, Carl Clifford, will also include liaison on aviation safety with civil aviation groups connected with all phases of air transportation.

Mr. Wright has been with CAA and predecessor organizations for 28 years.

First Mark II Learstar Delivered

The first Learstar Mark II conversion of an executive Lodestar has received a supplemental type certificate and been delivered to NBAA member Plymouth Oil Co. at Sinton, Texas.

The Mark II Learstar provides all the safety features and most of the performance features of the Mark I, but saves the owner's original investment in cabin furnishings, instrumentation, etc. The conversion can be accomplished in 90 days or less.

The following figures were quoted for the Mark II:

Gross Weight, Take-off: 22,500 lb.

Gross Weight, Landing: 20,400 lb.

Cruising speed at 10,000':

Maximum (840 hp/eng.) 290 mph TAS

Normal (700 hp/eng.) 270 mph TAS

Four NBAA Member Companies Send Personnel to USC Safety Course

Personnel from four NBAA member companies were among the thirty men who completed an intensive two-week course in aircraft accident investigation at the University of Southern California.

The member companies were: Aero Design and Engineering Co., Beech Aircraft Corp., North American Aviation, Inc., and Westinghouse Electric Corp. Aero Design's Chief Pilot, Clay M. Pape, was among the students, two men from Beech, a group of nine from North American, and two from Westinghouse.

Collection and interpretation of evidence to determine the cause of civilian and military aircraft accidents, and the preparation of accident reports, was taught in the class. Lectures covered such subjects as failure of materials, aircraft loads, impact angles and air speeds; the human factors in accidents were discussed by a psychologist, and an aviation physiologist lectured on oxygen requirements at altitude, explosive and rapid decompression, and escape from aircraft.

administration

This department will report on the problems of selection and procurement, of business aircraft, personnel policies, aircraft utilization policies, accounting procedures and other management methods relating to business flying.

NBAA Suggests Accounting System For Business Aircraft Operators

Ownership of aircraft by organizations as well as individuals has brought about many interesting cost-accounting procedures. It is realized that such accounting procedures now in existence often are simply extensions of before-ownership practices. These may not form an accurate picture of the aircraft's actual value to the users.

As part of its program to be of service to management owning or interested in owning aircraft for business purposes, the following outline suggests accounting procedures recommended by NBAA to its members.

By establishing a common ground for cost-accounting for all operators, more accurate information may be obtained to determine the operating costs of various types of aircraft. Such information, compiled and tabulated for all owners or prospective owners, will serve to give more complete information for guidance, in inter-company exchange, in changing of operating methods, purchase of new aircraft, or evaluation of several types of aircraft.

I. Flight Expense

A. Salaries—should include the full salaries of all crew members assigned to an airplane. Other salaries are to be included under II-D below.

B. Expenses—should include all expenses of crews away from home port and a proper proportion of expenses of other aviation personnel spending whole or part time in aviation activities.

C. Aircraft Fuel

D. Aircraft Lubrication—should include all gasoline and oil used by an airplane whether for test or regular service.

E. Insurance—insurance carried by members varies widely and therefore tends to disturb accurate cost comparisons. Some members carry "own-risk" for Workmen's Compensation, others insure. The same is true on other forms of insurance, particularly "flight" which carries a high cost factor. Each reporting owner should keep insurance premium costs segregated and be able to compare in accordance with the following outlined breakdown. Where "own-risk" is assumed for any phase of insur-

ance, actual losses should be reported in lieu of insurance premium costs.

1. Ground
2. Flight
3. Public liability and property damage.
4. Passengers and crew, incl. W/C
5. Miscellaneous (Stores, Spares, Hangars, etc.)

F. Miscellaneous—should include such items as pilots' uniforms; uniform jewelry; galley expense such as coffee and meals aloft; expenses for such necessary cockpit items as Airmen's Guide, Jeppesen Manual, Coast and Geodetic Maps, Radio Facility Charts, etc.

II. Ground Expense

A. Taxes and Licenses—self evident but to include all federal and state fees such as registration, radio licenses, etc.

B. Hangar and Port—should include regular home base hangar rent or expense and such hangar charges as may be necessary when away from home port, including take-off, landing, tie-down and parking fees.

C. Maintenance and Repairs—should include the cost of parts and materials and drayage for same, the cost of mechanical labor other than that of assigned pilot and/or co-pilot (which is included in I-A above), whether such labor be by contract or by company employed mechanics.

D. Salaries—salaries chargeable to ground expense should include a proper proportion of all ground personnel spending whole or part time on aviation activities such as chief pilot, check pilot, dispatcher, administrative help, warehousemen, storekeepers and others including janitors and such mechanical help as may be general in nature and redistributable to specific airplane costs.

E. Miscellaneous—should include all items not covered by I-F above and II above.

III. Depreciation

The depreciation costs shown shall state the depreciation rate, i.e., 12½%, 16%, 20%, 25%, as the case may be.

IV. Statistical Data

- A. Miles Flown
- B. Cost Per Mile Flown
- C. Hours Flown

D. Cost Per Hour Flown—passenger miles and hence the cost per passenger mile are mostly uncontrollable in business aircraft operations. The compilation cost per passenger mile stems from airline operations where close scrutiny is given to cost vs. "revenue." Business flying is not concerned with revenue but with service to key personnel, planes frequently being used

in business emergencies where the utilization of available seats is low. NBAA does not recommend cost per passenger mile as an item subject to standardized comparisons between members.

Statistical data should be kept on an accumulative basis, acquisition to date. Interim data may at any time fail to be factually representative because of monthly fluctuations of costs due to engine changes, overhaul costs, major equipment and radio installations, etc.

Survey Indicates Business Pilots Favor Joint Civil/Military Ports

The NBAA has recently concluded a survey in which members were asked: "Do you favor the joint civil/military use of airports as a means of increasing the number of landing places available to every type of Civil Aircraft (a) when airport is owned by the military, (b) when airport is owned by a city?"

The replies indicate that 68% favor joint use of military airports to increase the number of available landing places, and over 71% of the replies favored letting military agencies have joint-use privileges of municipal airports.

About 87% of the members answering the questionnaire stated that their civil airplanes had landed on military fields during the past year. The landings were made 37% on government business and 63% as a convenience in connection with other business.

On the question of landing fees for the use of military fields, 84% were opposed to any charges, while 16% said charges would be acceptable.

The question "If a military airport is available for civil/military joint use, do you favor military regulations that impose personal injury and property damage insurance requirements that are higher than those customary in business flying?" brought a 94% opposition to higher-than-normal insurance requirements at military fields.

Business Aircraft Market: Comparative Statistics

Utility airplane production for 1956 is estimated at 6000, which compares with 4434 in 1955, 3788 in 1953 and 2302 in 1951. About 88% of the 1956 production involves four-place and over aircraft, over three times as many as were produced in 1951.

589 one- to ten-place utility and executive aircraft, the product of seven companies, were shipped during June, according to AIA's Utility Airplane Council; shipment included 61 one- and two-place planes, the remainder four-place or larger. Total value: \$9 million.

(Continued on page 39)



Lockheed scientists are designing

WINGS FOR THE ATOM

Domesticating the atom to serve mankind has intrigued science for over a decade. One top priority application, secretly under way for several years at Lockheed: developing a nuclear-powered plane as different from present types as a supersonic jet is from the first stick-and-wire biplane.

IMAGINE A GIANT AIRCRAFT SOARING ALOFT, NOT WITH TONS OF GASOLINE, BUT WITH A URANIUM FUEL SUPPLY NO BIGGER THAN A HANDFUL OF GRAVEL. EVENTUALLY, SUCH A PLANE-OF-THE-FUTURE—WITH THIS SCANT FUEL SUPPLY—WILL GIRDLE THE GLOBE NON-STOP BETWEEN SUNRISE AND SUNSET.

More than a dream, this incredible aircraft is now being developed by Lockheed for the U.S. Air Force despite problems of propulsion, structures and materials, thermodynamics, crew survival, producibility and maintenance unique in aviation.

Old concepts are being shelved, traditional solutions rejected. The kind of aeronautical advances that once took a generation of research are now being telescoped into a few months, even weeks.

Soon several hundred nuclear scientists and engineers from Lockheed's Georgia Division will move to the North Georgia mountain country. There on a vast site—some 40 miles from U.S. Air Force Plant No. 6 at Marietta, operated by Lockheed—will be built the nation's largest facility for the development of atomic-powered aircraft.

The exact status today of U.S. atomic pl

navicom

Devoted to information regarding the operation of business aircraft from first scheduling through flight completion, and the factors bearing on those operations, such as facilities, equipment, problems of navigation and communications, airspace regulations, new ATC procedures and new flying techniques. Comments and suggestions are invited.

New Holding Patterns for LaGuardia

Starting this month aircraft inbound to LaGuardia airport in instrument conditions will be vectored by radar to the final approach course from "transverse" holding patterns located over the Newark and Idlewild Low Frequency Ranges.

Previously all LaGuardia inbound traffic in IFR conditions has held over Flatbush and New Rochelle, and/or in very low conditions over the airport as well, using the ILS Middle Compass locator at Holmes. The lack of off-course, or transverse patterns, such as in use at Washington, and other high-density locations, made it difficult for LaGuardia controllers to identify aircraft holding in the on-course patterns early enough to issue instructions insuring the minimum safe interval on final approach allowed with full use of radar. Despite this, landing "interval" was often achieved, so close that departing aircraft using the same runway were hard-pressed to get out.

Pilots inbound to LaGuardia "IFR" may now expect to get cleared as follows:

I. From the South and Southwest, to Colt's Neck VOR or Newark low Frequency Range (holding pattern at Newark is standard 1-minute right-hand Southwest course, at Colt's Neck 1-minute, left turns, Southwest).

From Colt's Neck the pilot may expect clearance via Coney Island intersection at 7,000 feet or above, to the Newark pattern at 5,000 feet or above, or to the IDLEWILD pattern (Standard 1-minute right turns northeast course) at 4,000 feet or above. From these patterns he may expect a radar vector to within 30° of the inbound ILS localizer course in the vicinity of Flatbush, descending to approach altitude and establishing the desired interval between successive aircraft (traffic conditions permitting early radar identification may result in a flight being intercepted enroute to the two "approach hopper" patterns and being cleared/vectored direct to Flatbush for a straight-in approach).

II. From the West to the Newark pattern via Victor 10 at 8,000 feet or above, then as described above to the approach.

III. From the Northwest, North, Northeast, or East—to Idlewild low frequency range via New Rochelle at 6,000 feet or above.

IV. If landing Southwest (back-course of the ILS), the same primary "approach hopper" patterns will be used, but Radar Approach Control will vector the pilot so as to intersect the back-course in the vicinity of New Rochelle.

V. When weather conditions on the approaches to and at LaGuardia are reported to be at least 1,000 to 1,500 foot ceiling (at discretion of the tower) and 3 miles visibility or better, approaches may be permitted from both the Northeast and Southwest simultaneously, using the familiar Flatbush and New Rochelle patterns (at 2,000 feet and above), and restricting inbound pilots from one of either directions to maintaining 3 miles forward visibility.

VI. When the use of radar is impracticable for any reason, the flow of inbound traffic will revert to the old Flatbush, New Rochelle system (at 5,000 feet and above), and using "timed" approaches (2 minutes or better between successive aircraft leaving the "gate" fixes).

At the same time, inbound aircraft on Victor 10 from the West will be routed around Newark via the Newark Outer Marker to Flatbush to avoid conflict with outbound aircraft off Runway 13 at LaGuardia going to Chatham (west course of Newark—at Red 72).

Missed approach procedure from either direction remains unchanged. Departure traffic will be virtually unaffected. Current climb-out procedures as given to pilot prior to take-off, with his "short" clearance, will be as before:

South and Southwest bound, via Chatham and Victor 3 to Bellemead (on Victor 3 and Red 72), at 5,000 to 7,000 feet.

West and Northwest-bound, via Patterson and Victor 36 or Red 23 to Branchville at 4,000 to 7,000 feet.

North-bound, via either Glen Cove or Syosset and Victor 91 to Wilton, then Poughkeepsie north; or, via Yonkers intersection direct to Poughkeepsie, at 4,000 to 5,000 feet, but pilot must attain 4,000 feet before crossing Victor 3 (252°) radial of Wilton and his assigned altitude within the 20-mile range of the Departure Control Radar screen and intersect the South course of Poughkeepsie by or before Spring Valley intersection (265° radial of Wilton).

East-bound (and/or South-bound via the coastal route)—via Glen Cove, Syosset and Victor 167 (or South course of Bridgeport) to Bridgeport or Bay intersection at 2,000 to 5,000 feet; or via East course of LaGuardia (Red 23—Victor 46) to St. James intersection at 2,000 to 5,000 feet (then South on Green 5).

All participants in the development of the foregoing radar procedure at La Guardia are hopeful that it will result in more efficient inbound control of traffic, establishing and maintaining more easily the desired minimum interval between landing aircraft.

What may yet have to be figured out will be the expansion of the airport's one-runway, taxi-way and gate "acceptance rate," not mentioning the problem of "squeezing-out" heavy four-engine takeoffs between landings less than 90 seconds apart on the same runway!

Proposed CAR Change On Simulators

Parts 40, 41 and 42 of CAR currently require certain pilot proficiency checks to be accomplished twice a year by each pilot serving as pilot-in-command in air carrier service.

The object of these checks, of course, is to insure that a high standard of proficiency in piloting and navigation is maintained.

In addition to the normal airplane maneuvers, these checks include certain critical maneuvers that are encountered from time to time such as takeoffs and landings with inoperative engines, missed approaches, instrument let-downs, and various emergency procedures.

For several years, many maneuvers have been satisfactorily demonstrated in the flight simulators (as distinguished from the original basic Link trainers) plus an actual flight demonstration of at least four basic maneuvers, such as: Flight at minimum speeds, approach to lowest approved minimums, landing under circling approach conditions, and simulated engine failure at critical moments.

The development of these devices which accurately simulate the characteristics and layout of transport type aircraft has enabled the accomplishment of the entire proficiency check in a safer, more effective and economical manner. Training is better because of the unhurried psychological atmosphere of the immobile device as compared to an actual aircraft in flight which demands certain operational attention in competition with the training objective. The elimination of the traffic hazard

alone is a double reward. The ability to simulate emergency conditions which would be highly questionable aboard an aircraft in flight, is proof of the superiority of the simulator.

Therefore, the CAB-proposed rule change authorizing virtually the complete reliance on a training program built around these devices is of equal importance to non-air carrier professional pilots who, when they are not already ahead of the air carriers in their safety thinking, at least seek to keep abreast. Witness the growth in scope and popularity of the commercial flight proficiency organizations that have sprung up to serve the business aircraft field. (Ed. note: In order to insure a uniform high standard of training, the proposals include recommendations for specific standards for simulator equipment.)

ALPA Offers Interim Measures to Relieve Air Traffic Problem

The Airline Pilots Association has submitted through their ATC Committee a list of some 26 recommendations, growing primarily from the Grand Canyon crash, to their membership and to appropriate industry and government agencies.

Seven of the proposals are "immediately implementable," according to Clarence N. Sayen, ALPA President, and would have prevented the Grand Canyon crash if they had been in effect at the time. The most practicable changes include the following recommendations:

1. No air carrier pilot should be permitted to operate IFR in uncontrolled airspace. (Technically, both TWA and UAL were operating IFR off-airways.)
2. Eliminate the 1000-foot "on top" clearance; use IFR above 9500 feet east of the 100-degree meridian; IFR above 14,500 feet west of 100 degree meridian.
3. Raise VFR minimums in all controlled airspace (airport control zones and controlled airways above 700') to 1500' ceiling and 5 miles visibility; elsewhere for air-carrier operations to 1500' and three miles.
4. To require "control zones" at all airports having instrument approach procedures, rather than only at those with towers.
5. To permit controllers to eliminate VFR traffic into a terminal where IFR approaches are being conducted.
6. To eliminate VFR climbs and descents as part of any IFR clearance.
7. To require speed control in all high-density areas during IFR/VFR conditions.

Also included were recommendations for improved traffic information, better communications, standard configuration "A" approved approach lighting with sequenced flashing units (as at Newark) at all ILS runways, improved cockpit visibility, cockpit anti-collision devices, and the upgrading of the working controllers in high activity centers to provide pay-incentive.

Air-Aids Spotlight

ALABAMA—State Aviation Department issuing an aeronautical chart consolidating the Alabama segments of the Birmingham, Mobile and Chattanooga sectionals.

BALTIMORE, Md.—The move to have FRIENDSHIP Airport designated as the "alternate" for diversion of "excess" traffic at Washington raises question of classification of traffic and definition of word "excess." Anticipate move by CAB to force airlines to schedule certain DCA flights into FRIENDSHIP.

CANADA—Voice equipped radio beacons and LFRanges being equipped with "busy signal" like telephone counterpart. When radio operator is busy on other duties or frequencies, he can impose this signal to advise pilot, a device much needed here in the states! Also, 122.2 replacing 126.18 at many facilities.

CHICAGO, Ill. — MIDWAY TVOR frequency changed to 111.6 mc; O'HARE TVOR to be commissioned on 108.4 mc, identification "ORD."

COLTS NECK, N.J.—VOR identification now "COL."

DALLAS, Tex.—BRITTON intersection (FT. WORTH VOR 123°—DALLAS VOR 212°) marked by VORW on test basis, "BRT" on 117.0 mc. Back course ILS final letdown fix "TANK" now marked by fan marker (".") 1.4 mi. DALLAS-FT. WORTH VFR cross-traffic being asked to maintain 2000 ft. or above to avoid NAS HENSLEY jet traffic when NORTH takeoffs are being made.

DAYTON, Ohio—Tower primary VHF frequency now 120.7 mc.

DAYTONA BEACH, Fla.—Tower primary VHF frequency now 119.1 mc.

ERIE, Pa.—ILS serving Runway 6 recommissioned.

HOUSTON, Tex.—VOR frequency changed to 115.9 mc.

MILWAUKEE, Wisc. — ILS straight-in minimums Runway 1 now 200-1/2.

NEBRASKA — State operated TVORS commissioned at: BEATRICE, "BIE" on 110.6 mcs, receives 121.5, 122.1. KEARNEY, "EAR" on 111.2 mcs, McCook, "MCK" on 110. mcs; all receive above.

NIAGARA FALLS, N. Y.—ILS frequency to be changed to 110.1 mcs.

PENSACOLA, Fla.—NAVY commissioned BVOR on 117.2 mcs, "NAS."

PITTSBURGH, Pa.—VOR due out until end of October.

ROCKFORD, Ill. — ADF approach approved straight-in Runway 36 to 400 ft. and 1 mile.

SAN JOSE, Costa Rica—VOR and "Z" marker installed for early commissioning.

SALT FLAT, Tex.—VOR frequency changed to 113.0 mcs.

SAN ANGELO, Tex.—MATHIS Airport tower commissioned on 272 KC, 118.3 and usual common transmit and receive frequencies.

TEREBORO, N. J.—ILS frequency changed to 109.3 mcs.

The ALPA's approach represents a positive and realistic plan which may well serve as the nucleus of further proposals from private and business fliers.

Ed. note: Under consideration by the CAB are rules to make anti-collision lights mandatory on all new aircraft. Also under consideration is a rule requiring steady non-flashing navigation lights where a plane is equipped with anti-collision lights.

'Copter Crew Saved By Handy-Talkie Radio

A small portable 2-way radiophone saved the day when a helicopter, owned by General Air Transport of Louisiana, lost power and auto-rotated into the Gulf of Mexico 25 miles offshore.

The 'copter was enroute to a drill-

ing rig 70 miles from Morgan City, Louisiana, when the mishap occurred. It settled into the heavy seas and floated long enough for a rescue boat, summoned by the Motorola Handie-Talkie radiophone, to reach the pilot and two passengers.

Officials of Sinclair, operator for the group which includes Peoples Production Company, El Paso Natural Gas Company and Sohio Petroleum Company, said there is no doubt that the men were saved from exposure or worse by the 2-way radio.

As emergency equipment to back up regular aircraft radio in event of a crash in any remote or difficult location, in which the regular equipment might be disabled, seems obvious in this instance, not to mention the complete electrical failure of a commercial airliner not too long ago!

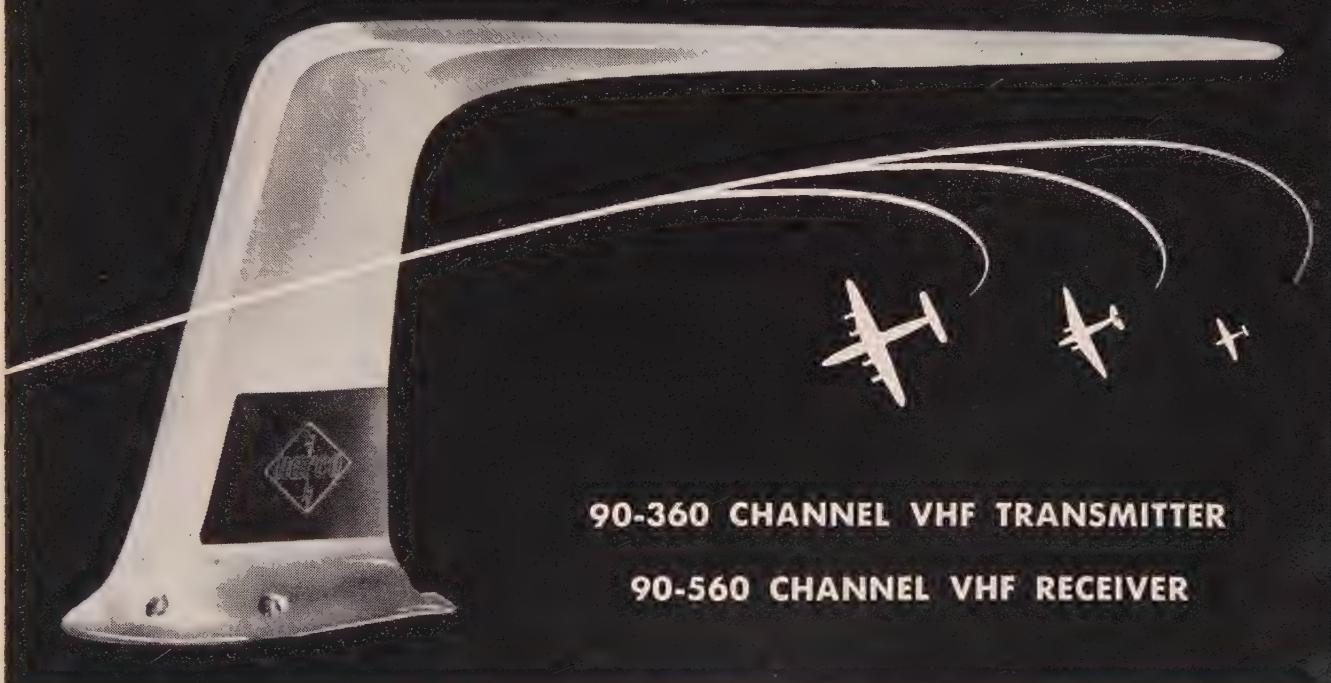
(Continued on page 40)

announcing... for airline and executive aircraft use

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1016



90-360 CHANNEL VHF TRANSMITTER

90-560 CHANNEL VHF RECEIVER



Complete unit occupies $\frac{1}{2}$ ATR rack, weighs $24\frac{3}{4}$ pounds. Unitized construction permits quick separation of transmitter, receiver and power supply units for easy servicing.

Narco introduced its airline-quality Sapphire line of navigation and communications equipment with the Narco DME...Now comes the Sapphire 1016 VHF communications unit designed to meet the maximum channel requirements for airline and executive aircraft use.

The Sapphire 1016 includes a high-powered transmitter of 90 to 360 channel capacity. It has a crystal-controlled receiver of 90 to 560 channel capacity with precisely defined 50 kc channel separation available throughout the entire range from 108 to 135.95 megacycles.

The Sapphire 1016 meets latest CAA TSO requirements for airline use. While its performance and channel capacity match the finest airline-type equipment available, the 1016 is offered at only a fraction of the cost of comparable equipment. See your Narco dealer or write for full details.

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NATIONAL AERONAUTICAL CORP.
AMBLER, PENNA.

safety exchange

A clearinghouse of practical information on recent developments affecting flight safety. This will include factual accounts and analyses of actual, in-flight occurrences (near misses, unusual in-flight experiences, conflicting traffic clearances, and other incidents of non-routine nature. In addition, CAA, CAB reports and other sources will be briefed.

Readers are urged to share their ideas with us, and to benefit from an exchange of experiences. Names of contributors will be withheld on request.

10% of Potential Overloads

Present ATC System

Instrument-flying aircraft comprise only 10% of the flying done in the United States today, but even this proportion of the potential users has critically overloaded the present ATC system. This fact was brought out in an editorial in the July 1956 issue of *The AOPA Pilot*, which goes on with the opinion that "if only half of AOPA's members turned up with instrument ratings and tried to use them, the entire ATC system would collapse . . . unless large segments of those now flying were arbitrarily barred from the air space.

The editorial goes on to point out that instrument flight on the present ATC system is a highly specialized skill which cannot be regarded realistically as being available to all private pilots, and that a safe instrument approach under adverse conditions requires the greatest skill of even the most experienced professionals.

Citing the present adaptability of the auto-pilot, the editorial concludes that we will have "fully automatic flight in general use long before we could bring the average pilot up to such a level of skills."

\$50 Anti-Collision Device

Incorporates Geiger Counter

Richard Y. Miner, an engineering executive associated with the Arma Div. of the American Bosch-Arma Corp., has developed a system, employing a Geiger counter with standard electronic hardware and altogether costing less than \$50, which appears to be capable of preventing up to 65% of collisions and near-misses of airplanes in flight.

According to Mr. Miner, an effective collision-avoidance system would comprise a beacon transmitter and a direc-

tion-finding receiver installed in each aircraft. All aircraft would radiate the same carrier frequency, and Mr. Miner indicates that a $\frac{1}{4}$ -W transmitter will actuate a good receiver at 100 miles. The directional receiver could vary from a small portable set to an airline-type ADF. The altitude of other aircraft could be determined by the receiving pilot by the pitch of an audio note, which would increase with altitude and which could be compared aurally or electronically with the pitch of the note corresponding to the receiver's own altitude.

An elementary unit which could be installed almost immediately in many present-day aircraft uses an LF/MF beacon on a set frequency within the range of standard ADF receivers, and incorporates a degaussing coil which renders the loop insensitive to its own signal. An alternative system, which includes VHF and UHF antennas, is also practicable, and, in either case, the system is simple and inexpensive, and may be refined as needed by the use of additional beacons.

New Anti-Collision Markers For High-Tension Wires

Two-foot aluminum sphere, painted International Orange and suspended from high-voltage power lines, are a new safety measure designed to increase the visibility of lines near airports, according to Flight Safety Foundation's Accident Prevention Bulletin No. 65-5.

The Bulletin cites two recent accidents which probably would not have occurred if the anti-collision markers had been used, and adds that, although the most obvious safety measure is to put wires underground, this is not always feasible. However, in Pennsylvania, a Justice of the Supreme Court recently handed down the opinion that power companies are "under a duty of care to pilots"; hence the need for some appliance that will reduce the collision hazard.

Vancouver's British Columbia Electric Co. has installed test spheres on wires that cross the Fraser River. The spheres used were spaced about 150 feet apart and weigh about ten pounds apiece. In Ada, Ohio, a similar installation has been made near an airport.

In-Plant Fire Truck Offers Protection and Easy Operation

The Ansul Chemical Co. has developed a fire-truck specifically designed for fighting fires in the confines of industrial plants and small airports. The

fire truck, which is as maneuverable as a regular plant lift-truck, is provided with dry chemical, carbon dioxide and water as extinguishing agents, and available accessories include ladders, utility bar, light, hose, portable fire extinguishers and extra nozzles. There is storage room on the truck for fire blankets, boots, air masks, coats and a first-aid kit. The truck and its equipment can be operated by one untrained man, if necessary.

Ansul spokesmen describe the miniature fire truck as the logical outgrowth of the need created by increasing numbers of sprawling one-store plants situated outside city limits and therefore unprotected by city fire departments. It is especially adaptable to volunteer groups at small airports where fire and crash protection depends on local base operators and corporation and commercial operators. Full size fire equipment is too technical for reliable non-professional operation, and usually beyond the financial capabilities of these groups.

No Time For Accidents at LaGuardia

C. S. Henry, who flies a Beech E-18S for Coates and Clarke, wants to know what the hurry is at LaGuardia Airport. He says: "On many occasions at LaGuardia I have landed and been requested to expedite turning off the active runway, and looked back to see a Connie or DC-7 about to touch down. Suppose I happened to land with a flat tire and couldn't clear the runway. I wonder if the big fellow would be able to take off and go around again. If I feel crowded by the tower, I usually land as far down the runway as possible."

Near-Miss With C-97

Bill Dotter, Chief Pilot for International Harvester, based in Chicago and flying a DC-3, had this hectic experience several months ago, while west-bound over Bergholtz compass locator west of Pittsburgh, cruising 8000' IFR (but in the clear). He says: "I was nearly rammed by an Air Force C-97 approaching from the northeast on a south-westerly heading and at the same altitude. The C-97 was overtaking at a quarterly angle and only quick action on the part of the co-pilot averted a collision."

Stunting in Direct Route

Guy Miller of Beech Aircraft Corp. tells of seeing a civilian AT-6 stunting over an airway in the vicinity of New Brunswick. Coming from the west we

all pass over New Brunswick en route to New York and we are having a nice conversation with that man in the Center. This sort of thing can really interfere with an otherwise very pleasant conversation and experience.

Aviation Fire Safety Pamphlets Available from NFPA

Four pamphlets on aviation safety, revised by National Fire Protection Association and officially adopted at its recent Annual Meeting, have been published and are now available at NFPA's office, 60 Batterymarch St., Boston 10.

The revisions, which contain new recommendations on aircraft fueling, baggage and cargo compartment fire extinguishers, inspection, maintenance and crew training procedures, aircraft rescue, and safeguarding fuel-tank atmosphere, are as follows:

No. 403: "Suggested Aircraft Rescue and Fire Fighting Equipment for Airports," (36 pp. 50¢); No. 405T-2: "Suggested Procedures for Safeguarding Aircraft Fuel Tank Atmospheres" (19 pp. 50¢); No. 407: "Fueling Aircraft on the Ground, Including Recommendations on Aircraft Fueling Hose and Aircraft Servicing Tank Vehicles" (38 pp. 50¢); and No. 408: "Aircraft Hand Fire Extinguishers" (16 pp. 25¢).

High Altitude Pop

An unexpected hazard in the well-stocked executive plane, the explosion of carbonated beverages, received consideration in Air Carrier Safety Bulletin #59 after an injury was sustained by a hostess handling bottled soda.

After a temporary prohibition, the air carrier has found that carbonated beverages may be boarded safely by observing a few simple precautions, most important of which are to avoid too-rapid cooling and to avoid any rough handling of bottles.

Recommended Amendment to Checklist for Engine Fires

Air Carrier Safety Bulletin #58 discloses that, as a result of studies made since the Convair 240 accident at Fort Leonard Wood, the Power Plant branches in Region Four and the Washington office recommend that company procedures be changed to include the fuel tank shut-off step earlier in the fire control procedure so that the company check-list would be in accordance with the approved Airplane Flight Manuals for the Convair CV-240 and CV-340 type aircraft. It is suggested in the Bulletin that similar adjustment is made in the check-list for other aircraft, since the hazard is not peculiar to the planes specified.

Airline Accident Has Lesson For Business Pilots

An interesting supplement to the conclusion of the members of this is-

sue's Round Table is CAA's accident report on the landing crash of an EAL Martin 404 in February 1956. The conclusion of the Board was that the probable cause of this accident was "an improperly executed final approach, resulting in a stall, during a steep left turn at an altitude too low to permit recovery."

This incident substantiates the Round Table conclusion in several ways: it points up the necessity of absolute knowledge of the minimum controllable speed of an aircraft, even more critical in a light twin than in a commercial airliner; and the necessity of knowing how landing configuration—gear and flaps down—further modifies control speed.

Finally, the accident corroborates the Round Table members who emphasize the need for pilot proficiency. The pilot of the 404 had 16 years' experience, and a capable plane that he had flown over 3000 hours. If even these circumstances did not prevent an accident, how much more important it is for the pilot of his first twin-engine business plane to be ready for any emergency, to know the limitations of his craft and the *limitations of his own skill*, to fly his plane *defensively*, in terms of what can happen to even the best.

Business Aircraft Accidents, 1955

The following is a list of accidents to executive aircraft over 12,500 pounds certificated take-off weight for the year 1955, extracted from the CAB Resume of U.S. Civil Air Carrier and General Aviation Aircraft Accidents.

Covington, Ky., Jan. 12: an executive DC-3 was involved in a mid-air collision with an M-202 in instrument conditions with a 700-foot ceiling. M-202 had filed approved IFR flight plan; DC-3 was operating without clearance and was unknown traffic in the control zone. Both planes destroyed, fire after impact; 2 fatalities on DC-3, 13 on M-202.

Park Ridge, Ill., Mar. 10: DC-3 struck an auxiliary power unit in pre-flight; substantial damage.

Miami, Fla., May 26: accidental retraction of landing gear during pre-flight; pilot attempted to relieve high hydraulic pressure by porting to extension side of gear and accidentally retracted gear; substantial damage.

Harrisburg, Pa., July 9: parked Beechcraft was being removed from in front of DC-3 when DC-3 taxied into left wing of Beech; no lights on DC-3 although darkness prevailed; substantial damage to Beech.

Houston, Tex., July 29: Douglas B-26 made wheels-up landing when nosegear jammed partially extended; four minor injured, substantial damage.

Tulsa, Okla., Sept. 27: Lockheed PV-1 groundlooped when flat left tire came off during landing and gear collapsed; substantial damage, 2 injured.

Union City, Okla., Oct. 3: Douglas A26-C exploded and burned in air; plane destroyed, 4 fatalities.

New York (LaGuardia) Oct. 6: Sub-

stantial damage to DC-3 when gear collapsed while taxiing; traced to low tension in down-lock cables and improper adjusting of actuating strut.

Ft. Smith, Ark., Oct. 11: DC-3 sustained substantial damage when touch-down was made short of runway; gear struck edge of concrete and collapsed. Threshold lights removed and temporary lighting inoperative; 15 with minor injuries.

Chicago (Meigs), Ill., Oct. 24: substantial damage to Lockheed 18 when left gear damaged in striking edge of runway in crosswind; wheels up landing accomplished.

Long Island, N. Y., Dec. 7: substantial damage to Douglas B-26 in inadvertent wheels-up landing.

Near Londonderry, O., Dec. 29: Lockheed 18 destroyed; icing caused loss of tail at 8000 feet; 2 fatalities.



Lear Expands Certified Distribution Facilities

The Learal Div. of Lear, Inc., Santa Monica, Cal., has begun a program to insure a nation-wide network of approximately 100 factory and CAA certified radio service stations to assure competent installation and maintenance of Lear radio, autopilot and navigation equipment. To be considered for Lear certification the distributor must first have CAA approval on his station and on all technicians on each class of equipment they are to service. Station certificates are classified accordingly: "C" for Communications Equipment, "N" for Navigation, "F" for automatic flight control, etc.

NBA Forum

Will Include Panels on Safety, Operations, Equipment and Maintenance Aspects Of Such Business Aircraft as:

DC-3

PV-1

Lodestar

Convair

Grumman

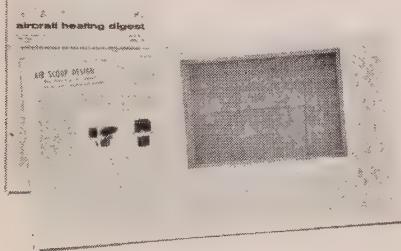
Lockheed Electra



FREE SUBSCRIPTION!

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pilots, mod centers

From time to time I've mentioned that you can mail a postcard to me to get your free subscription to AIRCRAFT HEATING DIGEST. But maybe you haven't yet because you don't know what it's all about . . . well sir, here's a picture of one issue.



AIRCRAFT HEATING DIGEST keeps you up to date on the newest developments in aircraft heating, gives a lot of basic information not found anywhere else, and has "how to" tips you can use. I have a column where I answer your questions . . . the tougher, the better!

Here's a rundown of typical articles appearing in the past:

AIR SCOOP DESIGN
SUPER DC-3 HEATING SYSTEM
CHECK LIST FOR HEATING SYSTEM DESIGNERS
AIRCRAFT HEATER OVERHAUL PROCEDURES
HEATER CLEANING TECHNIQUE
DETOURING THE HEAT BARRIER
EFFECTS OF WATER IN AIRCRAFT HEATER COMBUSTION AIR SYSTEM

AIRCRAFT HEATING DIGEST is good reading for anyone who owns, flies, or modifies anything from a light twin to a Globemaster. Send me a card or letter today and I'll see that you get your free subscription.

Cordially,

Joe

Janitrol Joe

Janitrol Aircraft-Automotive Division
Surface Combustion Corporation
Columbus 16, Ohio

Round Table

(Continued from page 10)

Braden: "We feel that our obligation to the customer is to stay with him until we feel in our hearts that he's capable of handling that aircraft through the normal emergencies that he is likely to meet. I've always believed in that and followed it through, particularly in new aircraft."

Davis: "Do you find any resistance on the part of the non-professional pilot to go through these more-or-less training procedures?"

Braden: "You get some eager beavers, but they can all be slowed down. It has to be explained properly. If they've got two engines, the easiest way is to take them up and pull an emergency on them. They'll quickly admit that they need more time when they can't straighten it out."

Colthorpe: "In the training procedure, the professional pilot can give you a harder time than the man who's just stepping up. We always respect something bigger. It's the fellow who moves down who more often thinks. 'Oh, this is just a simple thing.' It may be simple, but you must open your mind to learn even simple things."

Voyles: "That's why the AT-6 killed off so many men."

Braden: "You may, for instance, get a service man after the war who wants to rent a Cub. He probably flew P-51's, and he was the worst hazard you could have. To bring him down was a lot harder than to bring another man up."

Davis: "Arthur Whitcomb, you own and fly one of these light twins in the pursuit of your business. Would you like to give us the benefit of your actual experience in the capabilities of these aircraft?"

Arthur Whitcomb (President, Arthur Whitcomb, Inc.): "Tom, I've been sitting here and my ears have been burning because, for the last twenty minutes, you've been talking directly to me. I've owned an Apache for about a year and a half. It has seven radios, dual Omnis, ADF, ILS, automatic pilot, and a lot more. When I took delivery of this plane at the Piper factory, I was checked out. I remember making at least four single-engine landings. I remember that they showed me the minimum single-engine speed, had me slow the plane up until I lost directional control—they did everything possible to teach me how to fly the plane. In fact, they even went a step further.

"While I was waiting for my plane I asked permission to use a demonstrator for practice. They gave me permission, and I flew the demonstrator all of three hours. All of that time was spent doing single-engine work. Then I came home with my own plane, and nearly had an accident the third day.

"I had been demonstrating the Apache to another pilot, and after the demonstration I took a non-pilot in the front seat with me. Somehow, in the exchange of seats, the gas control on the

right tank was closed. This occurred before they had the safety catches to prevent accidental closure. I went directly out to the end of the runway, and started taking off without going through the check, because I'd only just come in and the plane was warm. I did check the controls, but that was all, and then I took off. I wanted to impress this pilot with the plane's performance. I started take-off with one hand on the controls and one hand on the gear lever. I pulled it off at 60 to 70 miles an hour, and then it happened—the right motor quit, and of course I didn't quite have single-engine controllable speed.

"I couldn't maintain direction over the runway, and started going to the right, toward some high trees. I thought the proper thing to do was to shut down the other engine and land, but I thought the gear was coming up, and I thought I would lose both props and damage the plane, so I sat through it and tried to maintain control. Just before I got to the trees, I found I had directional control, and went on out with one engine. As soon as I got out I was going to feather the prop, but in the meantime I noticed the gas off, and turned it on.

"The people who sold me the airplane did all in their power to teach me how to fly it; however, they could not prevent my carelessness.

"It was a close call. They say you learn by experience—I learned about flying from that!"

Davis: "Mr. Whitcomb, in your operation of the Apache, have you discovered any basic faults that you, as a non-professional pilot, with the training you've had, cannot successfully cope with?"

Whitecomb: "No, I haven't. Since then I've taken a course at Flight Safety, Inc., at LaGuardia Field. The very first time we took off, we went up to 6000 feet and put the wheels and the flaps down, and demonstrated slow flight, which was about 80 miles an hour. Then the instructor cut one engine. I dare say he cut the engine 25 times during the course, sometimes near the ground, sometimes making an ILS approach; and every time under the hood. I think that's the kind of training a pilot needs; I had about fifteen hours of that kind of training.

"A lot has been said about these light twins, especially the Apache. It has been asked, 'Would they fly fully loaded, at three, four or five thousand feet?' I have twenty eight hours more on one engine than I have on the other, so you see I've flown a lot on one engine. In the winter, you can fly with full tanks, four people and baggage, and it'll maintain 5000 feet on one engine. In the summer, depending on the thermals and temperature of the air, it will maintain between three and four thousand. The other day I flew alone over 100 miles at 8000 feet with the right prop feathered and with 75% power on the left engine. I don't think there's any excuse for a pilot getting into trouble flying on one engine with

the Apache, unless the terrain is mountainous, as it is in the west. Certainly not on the east coast. And as for an engine quitting on take-off, as I described earlier—what better performance could you ask for in those circumstances?"

Davis: "There's one other complication that a pilot is faced with in this more or less all-weather flying. Mr. Colthorpe, how does traffic in high-density areas affect the non-professional pilot in coping with emergency procedures?"

Colthorpe: "Actually, it's very apt to be a question of whether or not he has actually *thought* through all these emergencies while he is practicing the procedures. I personally dislike the word 'practice' because it denotes learning by rote. I think that what a man needs is *practice thinking*: if he practices the thinking part as he does the physical part of these emergency procedures, he will be in a position to cope with the same situation when he is *forced to think through* a traffic situation. It may not be an emergency at all if the man is capable of concise thinking when these things occur."

Whitcomb: "Immediately after I got my instrument rating, I tried flying IFR and I found that I couldn't do it. I didn't know anything about air traffic control, and I was in all kinds of trouble. I tried it a couple of times, and then decided I had to have more experience. At first I didn't know how to get it, but then it occurred to me that all you've got to do is *file IFR on a VFR day*. I did that for about fifty hours. Every time I made a flight I would learn something new, and soon I wondered why I ever had so much trouble. I had my instrument rating nearly a year before I felt capable of actually flying IFR.

"Now I'd like to ask a question. Something was said here earlier about flying without a co-pilot, flying IFR with just one pilot. How about flying with one pilot provided you have an automatic pilot? I tried flying with someone else as pilot, and I would do the radio work and the ATC work, figuring out estimates, and so forth. I noticed that this fellow was always looking over my shoulder, and soon he would be 10 or 15 degrees off course. An automatic pilot never does that. Is it safe to rely on an automatic pilot?"

Voyles: "I think an automatic pilot is a great help. However, if you're the captain of an airplane, and you just take someone at random and start flying instruments with him, you have to watch him carefully and double check him, and this might be termed a hazard. A pilot and a co-pilot have to work together as a team, and it takes a while to get acclimated to each other. At the outset it may result in a little ragged flying, but after a while it becomes very efficient.

"But if you have an automatic pilot, is it always reliable? If it malfunctions, you have to be in a position to cope with it. Too many people rely on the auto-pilot to get them out of trou-

ble, which it will not do. In my opinion, too many pilots around the country are flying weather solely in reference to that auto-pilot, and if it malfunctions for some reason or other, they have forfeited some much-needed experience."

Braden: "I'd like to disagree with the statement that the light twins are so critical. I don't like that word because, after all, Martins and Convairs, fully loaded, are just as critical as the light twins. I think the advantage they have is that their pilots have had the proper training to cope with an emergency when it arises, and some of our fellows haven't taken the time to ac-

quaint themselves with equipment, the limitations and the procedure. When you check the history of some of the accidents you read about, you often find that the pilot was not properly checked out. I think that's the point that we're missing in the light twins today—a proper full check-out. I think most manufacturers are trying to do it, but often they aren't set up to be a flight school operator. I think the man who sells the airplane is the one sometimes at fault, and fails to follow through, because the fellow's got a new plane and he wants to fly it. He wouldn't attempt to fly a Convair or a

(Continued on page 34)

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*SparTan Engineering

maintenance

This department covers cost-cutting, time-saving methods and devices for maintaining industrial aircraft efficiency. Technical tips from engine, airframe, electronic, instrument and other components manufacturers, CAA and AD notices, and other sources will be covered. Readers are invited to share their individual mechanical "know-how" with SKYWAYS editors, that it may be disseminated to all operators interested in business flying.

Increased Business Aircraft Utilization Seen From New Airworthiness Regulations

In line with its developing policy of delegating as much responsibility to industry as is feasible, the Civil Aeronautics Administration has effected a basic change in its airworthiness certification requirements. Certificates, formerly based on annual and periodic inspections and valid only for twelve-month intervals, are now of indefinite duration, remaining valid as long as owners have their airplanes periodically inspected by qualified repair stations, mechanics or manufacturers, and document their logbooks with evidence that these new requirements have been met.

According to CAA Administrator Charles J. Lowen, "This new inspection system greatly simplifies aircraft ownership . . . and permits CAA to concentrate on the matter of surveillance for safety."

Approved Parts List Issued by CAA

The elimination of substandard replacement and modification parts for certificated aircraft is the subject of CAA's Aviation Safety Release #406. The release specifies the sections of the Civil Air Regulations which govern the reliability of parts obtained through regular channels, and concludes with a guide for determining whether parts are approved. Because of the value of this information, SKYWAYS reproduces it here:

1. Parts produced by the prime manufacturer without benefit of an approved inspection system or production certificate, will have an Approval Tag, Form ACA 186, attached on the larger parts and on packages of small parts, which will be signed by a CAA representative at the source of manufacture. Upon approval of the inspection system or issuance of a production certificate to the prime manufacturer, the use of the Approval Tag, Form ACA 186, will be discontinued. Thereafter, the prime

manufacturer's shipping ticket, invoice, or other documents will be acceptable evidence that the parts are approved for use on civil certificated aircraft subject to inspection for condition.

2. Parts produced by persons other than the holder of the basic type design, on which the parts are intended for installation, will have an Approval Tag, Form ACA 186, attached to the larger parts and on packages of small parts, which will be signed by a CAA representative at the source of manufacture. Upon approval of a parts manufacturer's inspection system, the use of the Approval Tag, Form ACA 186, will be discontinued. In lieu of this tag, the symbol "CAA-PMA" will be displayed on each part or package of small parts, in addition to other identification data required by Civil Air Regulations, section 1.55, as evidence that the parts were produced under a CAA approved inspection system and acceptable for installation on a certificated aircraft subject to inspection for condition.

3. Certificated repair agencies, in the process of maintaining and servic-

ing aeronautical products, may fabricate and install replacement parts subject to individual substantiation and CAA approval. Such parts should not be sold through normal trade channels for installation on type certificated products, unless the manufacturer complies with Civil Air Regulations, section 1.55. If, however, such parts are sold, their installation is subject to individual substantiation and CAA approval.

4. Genuine military surplus spare parts may be used to maintain type certificated military surplus products provided such parts are inspected for eligibility and condition with respect to materials, deterioration, damage, rated mechanical functioning, reliability, and related qualities, affecting airworthiness. These parts must also comply with any existing military technical orders, manufacturer's service bulletins, and CAA Airworthiness Directives; otherwise, the type certificated products upon which they are installed are no longer eligible for airworthiness certification.

CAA Lists Approved Processors Of Chrome Engine Cylinder Barrels

CAA General Maintenance Alert Bulletin #113 lists the following companies as approved processors of chromium plated aircraft engine cylinder barrels for certificated aircraft engines:

Van Der Horst Corp., Olean, N. Y.; Spar-Tan Engineering Co., Los Angeles, Cal.; R. E. Mattison Co., Oklahoma City, Okla.; Pennington Channel-cromium Co., San Antonio, Tex.; Industrial Hard Chrome Plating Corp., Emeryville, Cal.; and Terry Industries, Inc., San Antonio, Tex.

Except Spar-Tan, the plating produced by all of these companies is of the porous surface type, with irregular channels about .004" deep running over the entire surface; the lubrication channels in Spar-Tan cylinders are

Aircooled motors (Franklin)

Continental

Jacobs

Kinner

Pigman, LeBlond, E. Rearwin, Ken Royce

Lycoming

Menasco

Pratt & Whitney

Ranger

Warner

Wright

ground into a smooth chrome surface in a separate operation.

These processes can be utilized with no restriction on engine horsepower except R. E. Mattison, which is limited to engines under 600 hp. Cylinders should not be preground beyond approved limits for oversize, however, and a current list of permissible cylinder oversize follows:

Cylinders plated by these approved agencies may be identified by the pregrind oversize ("15" or "20") and at least the following designations:

Spar-Tan—"SHCP" and orange paint below cylinder barrel flange; Van Der Horst—"VDH PORUS-KROME" or "Chrome Plated"; Precision Plating Co. and Pennington Co.—"CHROME PLATED" and orange paint on exposed surfaces of cylinder; R. E. Mattison—"REM-1 (date)."

Solid cylinders	.020"
R-670, W670, R9A	.020"
All others	.015"
All	.020"
All	.015"
All	.025"
All	.020"
All	.010"
R-2800 B, C, CA, CB	.025"
All others	.020"
6-140-early cyls.—6-390	.010"
6-140 late cyls.—6-440 (L-440) series	.020"
All	.015"
All	.020"

Department of Commerce Issues General Maintenance Checklist

The following general maintenance inspection aids, as issued by CAA, are of interest to owners and operators of business aircraft, and should be helpful in the new progressive maintenance program now in effect.

Aero Commander Model 520—Hydraulic return line from filter to wing: An inspection subsequent to loss of hydraulic fluid and pressure disclosed the hydraulic line and fuel line located in the left wing, 15" outboard of fuselage and 2½" forward of flap leading edge, was chafing on the bolt which attaches left inboard flap rod to pulley fitting. To inspect affected area involves removing inspection cover in wing forward of flap leading edge by removing approximately fifteen 10-32 screws.

Aero Commander Model 520 (Lycoming GO-435-C2B)—Bendix S6LN-51 Magneto Impulse Coupling Flyweight: An investigation to determine the cause for an inoperative magneto disclosed that the pin retaining hole in the flyweight became elongated, permitting side play between flyweight and pin. This permitted the flyweight to malfunction to the extent of disintegration. Pieces of the flyweight lodged in the drive gear teeth, resulting in failure of the gear. An increasing number of reports are being received describing this type failure.

Aero Commander Model 560—Fuel Line Coupling Nut: Fuel was leaking from around the coupling nut at elbow located in the main fuel line between center section and fuel shut-off valve.

Beechcraft Model A35—Nose Strut Assembly P/N-35-825110: During an inspection, a crack was discovered in the nose strut extending one-half the area at a point where retracting link attaches.

Beechcraft Model C-50—Tires (recapped 8.50-10, 6 ply): A recent incident believed worthy of dissemination was that of a subject aircraft having tires replaced with the originals that were recapped by a reputable agency, resulting in damage to the landing gear well doors when the wheels were retracted. Subsequent to the recapped tires being installed, a retraction test was made and clearance was ascertained to be 5/8" with struts extended. Obviously, the incident was caused by ballooning of the tires because of thermal expansion and centrifugal forces, which evidently are more pronounced in recapped tires than new tires.

Cessna Model 170—Elevator Bellcrank Bracket P/N-0510142, P/N-0510143: On inspection, the top end of each bracket was found cracked at rivet holes where bracket fastens to bulkhead.

Cessna Model 170B—“Goodyear” Wheel Brake Casting, P/N-95-30409A: Wheel brake casting was found cracked at mounting holes. Cracks were visible with wheel installed.

Cessna Model 182—Fuel vent system: Two recent reports describe mal-

functioning of the fuel vent system. Fuel siphoned out of tank vent during flight and while aircraft was on the ground.

Cessna Model 195—Right elevator (outboard hinge bracket): A routine inspection of the aircraft's control system disclosed the elevator hinge half, which is attached to the elevator, excessively worn.

Cessna Model 310—Fuel and hydraulic lines: Inspection disclosed severe chafing of the fuel and hydraulic lines running in the wing's leading edge between the fuselage and engine nacelles.

Cessna Model 310—Rudder: Shortly after take-off pilot discovered he had no rudder control. Subsequent to landing, an inspection disclosed all the rivets holding T flange to rudder post had sheared. The previous night to aforesaid flight, the aircraft was parked in open storage with the tail into the wind, to which the damage may be attributed.

Cessna Model 310—Upper cowl P/N-0851000-7: Inspection disclosed a 12" crack in top cowl. Further inspection revealed underside cowl stringer cracked in various places.

Cessna Model 310—Front oleo “O” ring seal in nose wheel shimmy damper: Severe nose wheel shimmy developed on landing roll, resulting in damage to nose section of aircraft. Investigation disclosed oleo “O” ring seal permitted fluid to seep out, gradually dissipating damper fluid supply until malfunctioning occurred.

Cessna Model 310—Weld assembly torque tube P/N-0843500-4: The weld that secures the landing gear actuating arm to the torque tube failed.

Cessna Model 310—Alcohol line to propeller de-icer: An inspection disclosed that a portion of the propeller de-icer alcohol line which passes between the firewall of the right engine and front spar had chafed against the stiffening corrugations in the firewall to a point of complete failure.

De Havilland 104 Dove—Rudder (top hinge bracket) P/N-4TF95A: Inspection disclosed a crack in rudder top hinge bracket, P/N-4TF95A, approximately ½" long, which appears to have commenced in web area and extended around one side of lug. Crack apparently resulted from tightening of hinge bolt with excessive clearance between the bracket and hinge link, P/N-4TR15A.

Douglas Model DC-3—Rib assembly (Rib No. 7 and 8): Inspection disclosed subject ribs cracked at fore and aft attach points to stringers in top of wings only. Cracks originated at holes in the rib flange, through which the rivets to stringers are located.

Lockheed Model PV-1—Center section main beam drag strut anchor bolts: An investigation to determine the cause for collapse of the left landing gear disclosed the four AN6-54A bolts, which extend through the upper part of the main spar, was fractured approximately 1½ inches from the nut end. The subject bolts are not readily

accessible for inspection, which may be attributed to this failure.

Lockheed Model 18 Series—Oil tank hopper reinforcement: It has been reported that some unmodified PV-1 oil tanks are appearing on series 18 aircraft, subsequent to original compliance with AD-46-13-3. Normally the annual or 100-hour inspections would not catch such an item when the maintenance record indicates that the AD had been previously complied with. In addition to this modification being required by AD-46-13-3, Lockheed Service Bulletins 99, 139, and 161 cover the modification.

Navion—Oil sump assembly P/N-352071: Severe oil leak occurred, resulting from a crack across the weld seam at the bottom of the oil sump.

Piper Model PA-23—Safety lock for accidental retraction of landing gear: On leaving cockpit, a mechanic accidentally bumped gear retraction handle, resulting in collapse of main gears. Investigation disclosed that the spring which holds safety pin open did not have enough tension, permitting gear retraction handle to be raised without first moving the safety pin.

Piper Model PA-23—Elevator attachment bracket: Inboard doublers on elevator, where horn attaches, had cracks at three of the four holes. The bolt, which attaches the elevator walking beam to the horn, was badly worn.

“This led to metallurgical analysis of valves purporting to be 128899 exhaust valves which showed the absence or near absence of dome coating, a dome thickness below minimum requirements, and in one instance a partial coating of outmoded material. These deficiencies are likely to result in collapsed valve domes or other valve malfunctions. Analyses further disclosed use of improper tip material, which has caused and is likely to cause severe tip pounding and wear which result in valve failure.”

For detailed instructions on performing the check to determine whether it is a Curtiss-Wright supplied 128899 valve, the subject service bulletins should be obtained.

Piper Model PA-23, Serials: 23-376 to 23-445; 23-447 to 23-478; 23-480 to 23-488; 23-490 and 23-493—Hot air ducts: Field experience has prompted Piper Aircraft Corporation to issue Service Bulletin No. 144, which is quoted below for your information:

“The 1956 Apaches, identified by the subject serial numbers, were partially equipped with a brown aero duct flexible tubing in the aircraft hot air system. This material has not been satisfactory in that in certain concentrated heat areas of the system, the air temperature was high enough to cause the resin of the flexible tube to separate and give off an offensive odor. In time the tubing will deteriorate to the point where it will turn black and become porous.

“It is requested that the brown flexible tubing in the hot air system of the above mentioned airplanes be removed and replaced. It is further requested

(Continued on page 44)

Round Table

(Continued from page 31)

larger airplane, but he's flown a Bonanza and had the money to buy this thing.

"He can fly it, just as safely as the other, but he has to go through the same shake-down and familiarization. I remember that the first thing they told me when I was checked out in a twin-engine plane is that, when you come in to land with one engine out and the gear and the flaps down, *you're going to land*; there's no thought in your mind about going around again. I think that holds with all types of aircraft. They all have a point beyond which there's no return. I don't like

to see the word *critical* used with such a fine machine as the manufacturers are giving the industry today. Like many tools, used properly it's just as fine as anything you could have."

Colthorpe: "I think we might better use the word 'critical' in our research today possibly as meaning 'margin of safety,' a margin with which a pilot can work when a certain situation arises. Obviously that margin is to a great extent under his control. In many cases, unfortunately, the inexperienced pilot causes that margin of safety to become smaller and smaller for one reason or another. Therefore, he does have a smaller margin of safety than a larger aircraft under the same circumstances.

"You commented that when an engine is out and the gear is down, at a certain place the airplane is going to go on in. But I would point out that it's a question whether it happens over Denver or over Atlantic City, on a hot or a cold day, etc. The facts show that the margin you're operating with, the operational margin, is different on supercharged equipment than it is on a twin Riley. Having flown both types, I can appreciate the difference with equipment capable of producing its rated power under varied conditions.

"We have a manufacturer, a distributor, and an owner. They all summarize the problem very thoroughly. We all recognize that *there is a problem*. The manufacturer has told us that they have a program, and to me it sounds like an admirable program, for combatting this thing. Our distributor has likewise outlined a program, and we had an owner say that he's aware of the problem, and has, with the help of a manufacturer, tried to make the necessary corrections. In spite of these expressions of preventative methods, the facts indicate that our efforts are not meeting with complete success. Therefore, somewhere, these methods are breaking down.

"I took advantage of the fact that I had a forty-eight hour warning on this discussion today to ask a few people who have recently acquired light-twins just what they had done to date in expanding their knowledge of flying in general and specifically as it applies to their aircraft. I have found that for the majority, their education stopped immediately after their first demonstration ride, and possibly one additional ride with some fellow around the airport who is known to be an expert pilot for one reason or another, after they actually had received the airplane. Therefore they have not sought out any real professional assistance. I think this probably goes back to the fact that they are not yet fully aware of the problem they are up against."

Voyles: "Someone's not properly selling the prospective aircraft owners on the idea of availing themselves of these check-out procedures and so forth. If they don't ask for it, I think the manufacturer should question them on it. In our case we try, and the distributor should ask him to come back from time to time until the man is very thorough in the operation of his airplane. We had a question earlier you brought up about demonstrations. We have a program out at Aero Design and Engineering whereby we go around with our distributors and their salesmen and show them how to properly demonstrate the airplane. Not over-selling but sell its advantages—sell the airplane as it is, not over-represented. Our demonstration policy throughout the United States, we think, is the best. And when we sell a man an airplane, it's sold as it is represented, nothing more and nothing less."

Davis: "I think we all agree that the main problem in safe flying rides with

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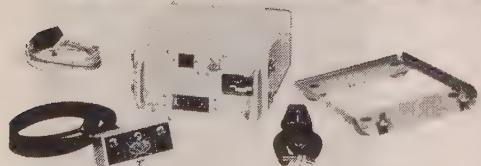
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the pilot and his ability to absorb the knowledge to fly the aircraft as prescribed. However, we are getting into a mass market of the light twins, and as we do so, we run more and more into the non-professional, even the amateur pilot. I would like to ask Mr. Amis, or you, Mr. Voyles, what the manufacturers are doing design-wise to compensate for this known deficiency that we are faced with despite all the effort we do on training? What are the manufacturers doing in matter of automatic devices and safety capabilities of the airplane, to eliminate the deficiencies of the pilot?"

R. T. Auis, Jr., (President, Aero Design and Engineering Co.): "It's impossible for me to talk for other manufacturers of twin-engine aircraft; however, it is possible for me to cite some of the things we have done.

"We know from past records that gas selector valves have been a problem. We use, instead of a manual control valve, an electric valve. The electrical switch controlling the valve is placed so that it cannot be changed inadvertently. The valve is driven by an electric motor, and is either open or closed. This eliminates the possibility of kicking or sticking a valve handle so as to close or partially close a gas valve. We have also eliminated cross feeds, and drain all of our tanks through a center sump. This fuel system gives the use of practically all the gasoline aboard, and allows for an absolute minimum of trouble from the gasoline system.

"We have also designed into the airframe a much improved aileron and rudder control. In the earlier twins it was nearly suicidal to drop a wing at practically a stall speed; we are able to do this. We have good rudder control under single-engine operations. The airplane is unable to think for itself—a pilot still has to fly it, but aerodynamically we have come a long way to help him."

Whitcomb: "I believe a pilot can save himself a lot of worry and possible trouble by leaving the gas controls and crossfeed alone. I never touch them. The gas control levers are saftied on, and the crossfeed is in the off position at all times."

Braden: "But getting back to this other matter I'm afraid, with all the manufacturers, they can hardly be responsible for checking these people out. I think it's the salesman's responsibility. He demonstrates to the prospective owner; he knows something of his background, and by talking to the people around the airport can find out what the man is capable of doing, what he has done in the past and what he is likely to do. The salesman is closer to the customer than the manufacturer is."

"Often, a customer with a rating will arrive at the plant to pick up his airplane, and it's pretty embarrassing for the manufacturer to go into a great deal of questioning. While the manufacturer does go through the process

of checking him out, he can't do the job that the local distributor can. I'm sure that the man who sold Mr. Whitcomb his plane knew of his background and his needs, and while Piper was more than willing to check him out and do everything they could, they wouldn't be able to know weaknesses that a distributor might have picked up. It's part of the job of selling."

Davis: "Granted that the requirements for safe flying of these light multi-engine airplanes rest primarily with the pilot, what do you think could be done in the way of improving or changing the CAA regulations to put more of the responsibility in the regulatory bodies than in the pilot. Mr. Braden, do you want to comment?"

Braden: "Well, I have no particular complaint in that field. I think that we're all working together and getting a pretty good answer."

Davis: "Well, are the CAA flight test procedures adequate to examine a man for the multi-engine rating?"

Braden: "I think in most cases they are. I think most of your safety agents and flight examiners know what's needed, what's wanted, and I think they're following the procedures pretty well."

Davis: "In other words, you can examine a man up to a certain point, but when it comes to judgment you have to . . ."

Braden: "The airplane can't think for him; he's got to do the thinking."

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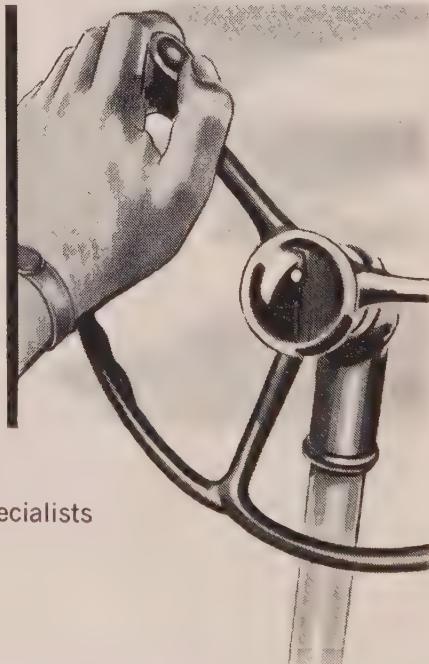
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Voyles: "That's certain."

Braden: "He's still got to have something to think with. We read of an experienced person doing foolish things. If he has been asked the question before the accident, he would have given the correct answer, but under tension, he just did the opposite: and that must have been the problem."

Harmon: "I believe we have covered some very good points in this discussion, and will all agree that perhaps the answer lies in everyone assuming some responsibility in this thing, not only the manufacturer, but the pilot in particular. Primarily, it's a question of education."

Davis: "As you know, the CAA recently distributed Aviation Safety Release No. 400. This release is intended to point out that certain features of the flight characteristics of twin-engine airplanes require pilot techniques beyond those required by single-engine airplanes. Do you have any further suggestions that the CAA can do to emphasize this to the pilot himself, or do you feel that the industry should cope with this educational problem?"

Braden: "I'm familiar with that release, and I think it's excellent. I think that people who read it, who were checked out quickly or went through this course in a hurry, will have gone back and reviewed, and realized some of the things that they should have known. I think it's an excellent release to bring to the attention of the examiners, and other people, the hazards of the twin-engine airplane, particularly with one engine out. It's *not full throttle* that does the job but *speed that gives you the control* that's needed to keep you on an even keel."

Voyles: "I concur with that wholeheartedly. I hope that your appropriation will permit you to circulate your Bulletin 400, especially the cartoon. If you could show people what V-1 and V-2 and VMC are, pictorially, it stays with them a lot longer than just reading. Show them how many feet it takes to accelerate an airplane up to V-1, then lose an engine, shut it down and stop the airplane; also to accelerate up to V-2. To show this graphically would be a big boon. I too felt that so many professional pilots have not had "one-engine-out" procedures for so long that they're getting stale on them. While I don't like a lot of government regulations, I'm of the opinion that pilots who are flying professionally should take a check every six months, like the aircarrier pilots."

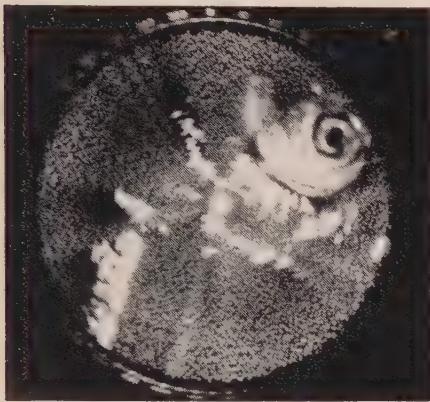
Braden: "I gave a flight test recently to a young fellow who had purchased a light twin, and before he went up he wanted to tell me that if I were going to feather a motor, he didn't care about taking a flight test! Right then and there, I told him that if we weren't going to feather a motor *there wasn't any use* in taking a flight test. If he could shut that thing off and get it started, I think he'd be safe in any situation. But he didn't agree. He gave me a hard argument."

(Continued on page 38)

nu-avi-quip

What Price Airborne Radar?

One picture is said to be worth a thousand words. The picture published herewith is a NAVY photo of a GE radar scope aboard the USS Oriskany near Okinawa last August. It shows a typhoon (tropical Pacific version hurricane; tornado, thunderstorm or what have you—show as vividly) named "Clara" approximately 100 miles away.



The eye and tail are clearly identifiable and realizing that the ship is located at the center of the picture, it can be seen that a course of minimum disturbance is readily determined.

Of equal interest is the announcement of Radio Corporation of America of the development of a radar system for the new F-104 Lockheed Starfighter that is not only compact and light weight but features a "bright" radar display which, for the first time, will enable the pilot to view the radar picture in broad daylight without the encumbrance of a light-shielding hood. A quick and frequent easy glance supplants the previous "head down and locked" intense study and re-focusing of eyes that has been a major objection to use of airborne radar in the often-smoked up hi-density areas where it could be most useful and along busy airlanes.

At the same time the Stromberg-Carlson division of General Dynamics Corporation is making significant progress in the development of its "Charactron" shaped beam tube recently released for commercial air traffic control purposes. Present day air route center radar is still far from the efficiency of presentation necessary to insure full, confident employment to solve the knotty airspace congestion so recently publicized in the general press.

The industry has recognized this fact both in and out of government circles but until the dramatic and tragic Grand Canyon collision, no support was forthcoming for the tremendous budgetary

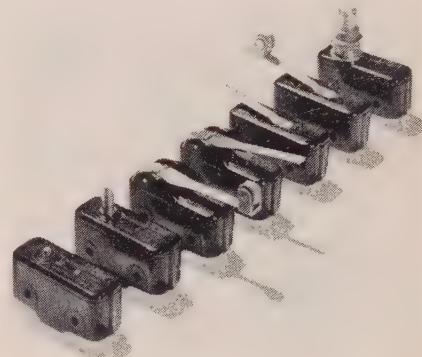
demands. It is ironic that the dual crash in no way relates to this fact and yet maybe now airways radar, like airport surveillance radar, will no longer rely on cast-off military equipment.

It is even conceivable that immediate advantage may be taken of the development of RADAT, a system whereby radar signals can be picked up from outlying radar screens and transmitted with accompanying identification and other pertinent data over existing telephone lines to any desired central location as an Air Route Center. Proposed radar airways have been so far predicated on the strategic spotting of manned long-range radar installations, an obvious highly inefficient and uneconomical employment of equipment and manpower. Produced by Skiatron Electronics and Television Corporation, RADAT is currently slated for the Navy and under pre-Grand Canyon scheduling, might become available to CAA and the civilian flying public in five to ten years.

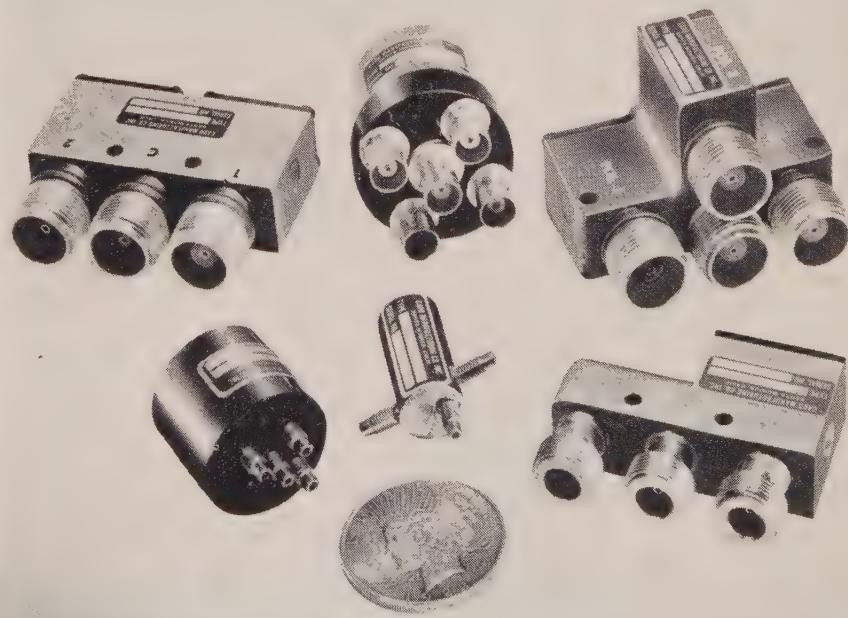
Another development, a micro-wave link contract awarded to Motorola will electronically gather air traffic information at Indianapolis Center from widely separated radar stations in the northern half of the Center's area, a zone about 400 miles long and 150 miles wide in Indiana and Ohio.

New Line of Standard Limit Switches

A full line of long-life standard limit switches suitable for aircraft has been introduced by the Licon (R) Switch & Control Div. of Illinois Tool Works,



Chicago. The Licon (R) Type-10 series is especially suitable for extreme sensitivity requirements, with a movement differential of less than .0005" and an exclusive "serpentine" snap action which has no dead center or pivot points to cause switch fatigue and flickering. The "serpentine" mechanism has given more than 10 million actuations in tests.



SUB-MINIATURE SWITCHES: Shown in size comparison with a silver dollar are six new-type RF co-axial switches for aviation radio and radar use just announced by the manufacturer, Cado Division of Electromation Co., Burbank, Cal. Left to right, front row, are subminiature SP3T type 27, subminiature SP2T series 27, miniature SP2T type N; l. to r., back row, hermetically-sealed SP2T type HN, SP4T type BNC, SP3T type HN.

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Round Table

(Continued from page 36)

"He said, 'We can do it the way the airlines do—just pull the throttle back to 15 inches.'

"I said, 'Oh, no.' My idea was that it's sometimes harder to get the motor started after everything's shut off than it is simply to fly it with one engine feathered, or at 'zero-thrust' rpm. and it was a good example of what we're talking about today. The fellow had been sold an airplane, and for some reason or other, the man that sold it to him ended his job there. The owner got the airplane, but he'd gotten a quick check out . . . very quick. And he didn't want any part of cutting the motor off."

Whitecomb: "Speaking again as a pilot, if you want me to be more careful, just give me more accident reports to read. I know they're gory, and I know that you don't like to print them in your magazines, but they are the first thing I read, and they do me a lot of good, particularly the reports about some experienced pilot, when little things start to pile up. These reports may save my life some day."

Braden: "I know many a time in my experience, and I'm flying for quite a number of years, I've remembered reading where somebody got out of a situation, and when I was in trouble, this thing came back to me. It's certainly made the job easier. The situation clears up very quickly by remembering what another man did in the same situation."

Colthorpe: "I think what we're recognizing here is that aviation has indeed come of age. Because all of us have a love for this business, we're all salesmen for aviation, whether we're actively selling a product or not. I'm sure we will admit that we have been guilty at times of over-selling it. I've come to the point now of admitting that it is time to really get the cards on the table. We have arrived at the point where we don't have to over-sell it; we can sell it on its merits, and on its merits alone."

Voyles: "Industry, in just the last couple of years has made a big start in recognizing the airplane as a business tool, rather than a toy, and I use the word 'toy,' advisedly, for the top brass. The salesmen, the engineers, the mechanics are the ones who are using the aircraft as it should be used. The surface has just been scratched in and out of the aviation industry. Therefore, we're going to have to standardize more in checking people out. More and more people are going to start using these aircraft. A program has to be initiated, and followed through, to show us all the various safety devices and techniques to be used in flying these personally-flown light twin-engine business planes."

Davis: "I think that we are now at a point where we can sum up this discussion. As just mentioned, it appears that there is a definite need for a program of check-out and proficiency in

the use of these new light twins, with special attention to one-engine-out procedures and handling. The CAA has recognized this need in their recent bulletin. Furthermore, there are advanced flight training organizations as well as distributors and dealers who are capable and willing to help the business pilot in this regard, if he will just ask for it.

"Although time, wear, and conditions will modify the performance of any quality machine, it is quite apparent that, given competent, trained handling, the new light twins' performance with one engine out meets all reasonable requirements set by government agencies or the flying public."

Now Hear This

(Continued from page 6)

Twin Coach Co., Aircraft Div., now has a backlog in excess of \$30 million.

Ryan Aeronautical Co. has declared a regular quarterly dividend of 10¢ per share on common capital stock.

Shell Oil Co. has agreed to install underground fuel system and sell aviation fuel at the Port Authority West 30th St. Heliport.

Slick Airways, Burbank, announced a 47% increase in air-freight ton-miles for the period January-May 1956 over the same period in 1955. Ton-miles for May 1956 show an increase of 459,000 over May 1955. The increase is ascribed to more direct-service routes and reduced rates.

Airtron, Inc., Linden, N.J., has established a new research facility at Cambridge, Mass.

AERO CALENDAR

Sept. 6—Seventh Annual Engine Operation and Maintenance Forum, sponsored by Airwork Corp. and Pratt & Whitney Aircraft, at the Airwork Corp., Millville, N.J. Repeat on Sept. 13 at Miami Springs, Fla.

Sept. 9-11—International Northwest Aviation Council, 20th annual Convention, at Boise, Idaho. Supplemented by sectional meeting of Ninety-Niners and district conference of Flying Farmers.

Sept. 10—Pratt & Whitney-Southwest Air-motive Co. Engine Forum, Melrose Hotel, Dallas.

Sept. 10-12—ASME Fall meeting, Cosmopolitan Hotel, Denver.

Sept. 10-14—American Society of Mechanical Engineers, Instruments and Regulators Div. Meeting, Detroit, Mich.

Sept. 16-22—American Society for Testing Materials, Second Pacific National Meeting and Apparatus Exhibit, Hotel Statler, Los Angeles.

Sept. 17—International Air Transport Association, 12th annual general meeting, Edinburgh, Scotland.

Oct. 1-3—12th Annual National Electronics Conference, Hotel Sherman, Chicago.

Oct. 1-3—Annual Meeting, National Association of State Aviation Officials, Lake Placid, N.Y.

Administration

(Continued from page 21)

Statistics from the same source show that American planes are increasingly favored in the overseas market. Five manufacturers sold 443 aircraft valued at \$5,238,792 to 24 foreign countries in the first six months of 1956, compared with 354 units valued at \$4,314,165 for the same period in 1955.

Conference Shows Small Business How to Share in Gov't. Contracts

Mid States Mfg. Corp., which produces the Helio Courier, and some 300 other small manufacturers and suppliers in the Kansas-Missouri area recently participated in a novel two-day "Procurement Workshop" near Parson, Kan.

Sparked by area businessmen, chambers of commerce and the Small Business Administration, the conference was held to show smaller concerns how they can share in the Government's annual \$30 billion procurement program. Present at the meetings were representatives of large corporations holding prime contracts, together with procurement people from the Air Force, the Navy, Army and Marines, who briefed the 272 midwest businessmen not only on the many types of sub-contract they might obtain for their businesses, but also on procedures they must follow to get this business.

In addition to the reactivation of a big 800-employee ordnance plant, an important immediate result of the workshop was the formation, by 13 different midwest cities, of the Mo-Kan Procurement Advisory Assn., whose purpose will be to funnel government production work into this two-state area for its smaller firms.

Maintenance Dock Has Fixed Base Potential

The Luria Engineering Co., New York City, one of the country's leading producers of standardized steel hangars



and buildings, has just completed construction of the first 69 pre-engineered maintenance docks for the Air Force. The docks are engineered to provide ample, weather-tight work area with a minimum of unused space and at much less initial expense than conventional hangars. The new docks should be of interest to commercial maintenance fixed base operators, as well as the larger business-fleet operators.

NBAA Membership

Information regarding regular or Associate Membership in the National Business Aircraft Association is readily secured by writing to the Executive Director and Secretary of NBAA at 344 Pennsylvania Building, Washington 4, D.C.

Membership in this non-profit and independent aviation organization is based on the recognition of business flying problems common to all users of aircraft for their business purposes and to those engaged in supporting the operation, servicing, equipment, and manufacture of business aircraft.

Among the fields in which NBAA is concerned are: improvements in airways and airports, better weather service, expansion in communications and air navigation facilities, higher standards of airport services, improved aircraft parts distribution, equitable tax rulings for business aircraft operations, greater recognition of the airplane as a necessary tool in modern business and industry, better air traffic control procedures, professional status for qualified business pilots, and aircraft designed to meet the special requirements of business flying.

VERSATILITY...



at Dallas Aero Service

Dallas Aero Service, an authorized Bendix Radio dealer, has completed the installation of Bendix Weather Radar in the Tennessee Gas Transmission Company's Executive B-26 as well as in the Company's two Executive DC-3 planes.

After the installation, flight tests were conducted to substantiate slow speed stability and high speed requirements to conform to CAR design standards.

BENDIX WEATHER RADAR
installed in TENNESSEE GAS
TRANSMISSION COMPANY'S

B-26
by DALLAS AERO SERVICE

In addition to the radar, DAS made other modifications to the B-26. Among these were the installation of a Feeder Fault Electrical System and Fuel Dump Chutes. In connection with the latter, Dallas Aero made in-flight movies of dumping fuel to proof-test the discharge pattern.

Dallas Aero Service is a versatile organization with the equipment, facilities and experience to provide any service for all types of airplanes.



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Navicom

(Continued from page 26)

NBAA Proposals for Fort Worth-Dallas Traffic

Thomas R. Neyland, who represented the Delhi-Taylor Oil Co., Dallas, at the July 26 meeting of NBAA, reports the following agreements concerning air traffic regulations for fields in the Fort Worth-Dallas area:

1. When the wind is northerly at Hensley Field, Love, Carter and Meacham towers will advise all traffic crossing the Hensley takeoff corridor to maintain 2000' MSL or above.
2. On northerly takeoffs or landings, aircraft crossing Hensley take-off corridor, arriving or departing Carter or Love Fields, make left turns in or out.
3. North from Hensley, VFR traffic will maintain 1500' MSL and 350° magnetic course until opposite the north tip of Grapevine Reservoir Dam.
4. The Navy at Hensley will use weather minimums of 3500'-5 miles for VFR.
5. Map and outline of procedures will be distributed through pilot organizations and the Navy.
6. Hensley tower will notify north-bound traffic to comply with the new procedures.

These regulations are intended to relieve temporarily the traffic problem, and the group recommended the initiation of a CAA study of the Fort Worth-Dallas air traffic problem.

Following are the participants at the NBAA meeting:

C. F. Davis, CAA, Ft. Worth, Texas, Chairman; Bob Cleminson, Houston Fire & Casualty Insurance Co., Ft. Worth; Walter Word, Montex Drilling Co., Ft. Worth; Ed Armstrong, Sid Richardson, Ft. Worth; Paul Harbaugh, LCDR, U.S. Navy, NAS, Dallas; Russell L. Bierman, CAA, Dallas; T. S. Bridges, Delta Airlines, Ft. Worth; Clyde McCall, American Airlines, Ft. Worth; H. L. Roberts, ATA, Ft. Worth; J. G. Sorlie, Braniff Airways, Dallas; Dick Bullock, CAA, Dallas; Harold R. Miller, ALPA, Ft. Worth/Dallas; M. M. Jacoby, Continental Airlines, Dallas; Jim Cowart, Trans-Texas Airways, Houston; L. A. Downes, Trans-Texas Airways, Houston; John W. Erwin, Delhi-Taylor Oil Corp., Dallas; Wm. A. Jessup, Flight Proficiency Inc., Ft. Worth; C. A. Commander, CAA Ft. Worth, Secretary.

Air Navigation Development Report Available to Business Pilots

The Air Navigation Development Board, Advisory Committee No. 3, has issued a final report on a composite coverage plan for common system short distance navigational aids. The coverage plan has been designed to meet the needs of all enroute air traffic operating at or above 700 feet above the terrain along the structure by the plan.

The report is available to all business fliers upon request to the NBAA, 13th Street and Pennsylvania Avenue, Washington 4, D. C.

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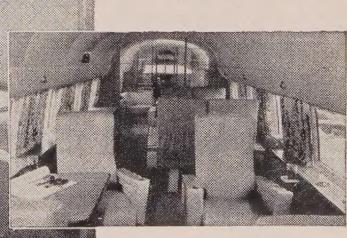
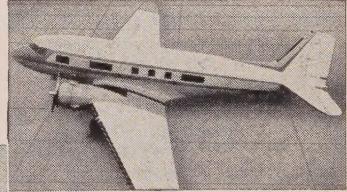
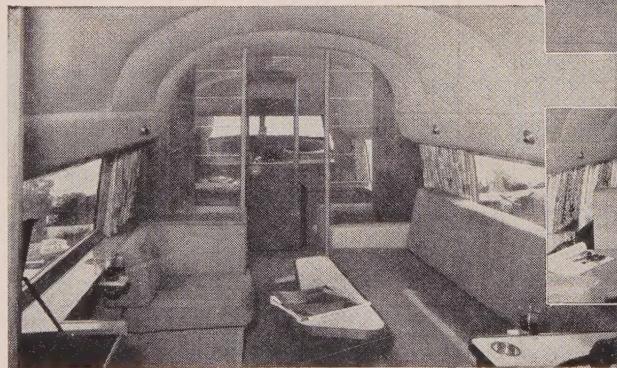
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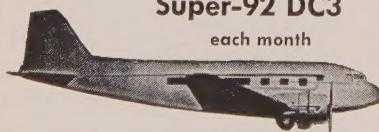
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After eight months of negotiation, Remmert-Werner has bought seven DC3 from DHY Turkish State Airlines, and has brought them to their conversion centers in St. Louis, Toledo, McBride, and Pompano Beach, for complete overhaul and modification into private aircraft. A & E mechanics spent several months in Ankara disassembling, crating, and moving the planes by cart, truck, and train (35 car loads), to Istanbul, where they were shipped by freighter overseas to Mobile, then by barge up the Mississippi River. They had been unused by DHY since purchase from the USAF, and are the last of the low time DC3-C47s (from one to six thousand hours total).

Each will undergo two to three months of rebuilding, with installation of modern engines and electronic equipment, and will be delivered on a production schedule of one per month, with a new ship guarantee on the airframe, and an 800 hour guarantee on the engines. As they are staggered in various stages of construction, some may be completed with many custom specifications desired by their individual purchasers, including choice of Bendix or Collins executive radio, and choice of engines—Super-92, Pratt & Whitney R1830-75, -92, -94, R2000, Wright R1820-56, -72, etc. Also available to order are such modern improvements as automatic pilot, X or C Band radar, extra Bendix, Collins, Sperry, A.R.C., Wilcox, radio and electronics, Skydrol hydraulic fluid, lightweight landing gear doors, retractable or faired tail wheel, special cowlings, long range outer wing tanks, 26900 manual, additional picture windows, special interiors, etc.

The DC3 is a proven all-weather ship, "the world's most experienced airplane," and is still the most generally practical and efficient large executive aircraft available today, unsurpassed and unreplaceable by later design. It has unquestioned dependability, with long range, high chock to chock speed, big capacity, big cabin, small airport ability, unequalled flexibility, top performance and handling characteristics, for economical maintenance and operating costs lower than those of many smaller planes. It makes the average business trip a matter of two or three comfortable hours of roomy, convenient, undisturbed privacy, with plenty of accommodations for extra passengers or baggage. Drop a line to Remmert-Werner today for an interesting history of this ubiquitous campaigner, with many fascinating anecdotes about its remarkable, many sided, civilian, military, commercial, and private careers.

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In the Business Hangar

(Continued from page 18)

executive B-25 has been completed by Dallas Aero Service; Jack Tarver, Pilot, flew the plane from Monroe, La. □ Dallas has completed a 200-hour inspection on World Airways' DC-4, piloted from Oakland by Harry Baker. □ Rugeene Transport Co.'s DC-3 was given a 100-hour check at Dallas Aero Service recently. The plane is piloted by Kermit Wood and Art Thomas. □ Dallas Aero Service has converted T. L. James Co.'s Twin Bonanza to the Hartzell 3-bladed propeller, as well as making a double engine change.

■ Spartan Aviation Service, Tulsa, has completed removal of left engine and installation of spare, and overhaul of engine

accessories, on Tidewater Oil Co.'s Lockheed Lodestar, Al Scarlatta, Pilot. □ Dick Powell, Pilot for Panhandle Eastern Pipe Line Co., Kansas City, brought their Beechcraft D-18 to Spartan for removal, repair and cleaning of right rear fuel cell. □ Bob Harlow, Pilot, brought Transcontinental Gas Pipe Line Co.'s PV-1 to Spartan for annual inspection of airframe, engines and instruments. Landing gear removed, zyglo inspected, repainted and reinstalled; two fuel tank liquidometers installed in front main fuel tank. □ John Ernst, Pilot for Franklin Supply Co., Tulsa, brought their deHavilland Dove to Spartan for 100-hour inspection. □ Aero Service Corp., Phila. sent Beechcraft D-17, Albert Bennyworth Pilot, to Spartan for 100-hr inspection.

■ L. B. Smith Aircraft Corp., Miami, has announced the delivery of the first Smith

CW-20T conversion of the Curtiss CW-26 to Northeast Airlines.

■ Dallas Airmotive, Dallas, is overhauling P&W R-985, 1830 and 2000 engines for the Oklahoma City center of CAA, and P&W R-1340-57 helicopter engines for Petroleum Helicopter, Inc., Lafayette, La.

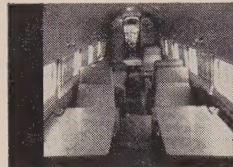
Roscoe Turner Aeronautical Corp., Indianapolis, has installed Wilcox 440 system, dual ARC omni, ARC T-21 transmitter, ARC R11A range receiver, Flite-tronics marker beacon, Wilcox glide slope and ARC CD-1 course director system on Baggett Transportation Co.'s Beechcraft Super-19.

■ Skymotive, Inc., Chicago, has just completed the installation of Bendix radar and other modification work, including stripping and repainting, on Texas-Illinois Natural Gas Pipeline Co.'s DC-3.

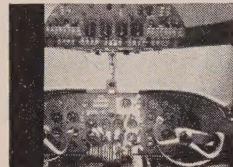
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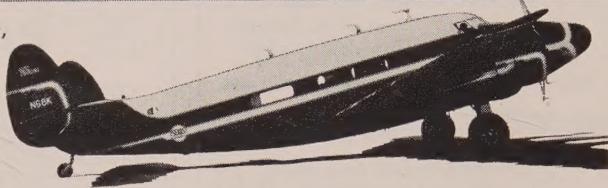
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Maintenance

(Continued from page 33)

that the cabin heater be operated on low heat only until these ducts can be changed. The replacement material can be obtained through the distributor from whom the airplane was purchased. Detailed instructions and replacement duct will not be available until June 1, 1956. Sixteen hours of warranty labor will be granted to make this modification. Compliance with this bulletin is required prior to October 1, 1956."

Wright Engine Series: C9GB; C9GC; C14BA and C18BA—Service Bulletins Nos.: C9-256; C14-152; C18B-392: Curtiss-Wright Corporation has recently issued the subject mandatory service bulletins, requiring all subject valves not supplied directly by them or their divisions to be inspected for the following reason, quoted from the aforesaid bulletins:

"It has come to our attention and has been verified by us that exhaust valves are being sold by others than this corporation and its divisions as 128899 exhaust valves which do not meet the standards and specifications of that part, and the use of which in our opinion may constitute a hazard to operation of engines in which they are used."

Worn Tools Cause Hydraulic Failure

An airline operating DC-3 equipment recently reported a hydraulic system failure that was caused by a foreign piece of rubber caught in the return line. Investigation disclosed that the rubber was from the Aeroquip lines on the pressure side of the hydraulic pumps on recently assembled power packs.

It was traced to a worn mandrel of the assembly tools, which scored or gouged the inner lines of $\frac{1}{2}$ inch Aeroquip hose. The worn tools were discarded and new tools obtained.

Firewall Cannon Plug Stalls Engines

The stalling of a Wright 1820 engine on a Lockheed owned by Thatcher Glass (NBAA member) was traced to a firewall cannon plug. Formerly, the plug was a three-thread overscrew type, saftied by wire through a drilled hole secured on the underside of the plug. The wire snapped on takeoff and permitted the screw to back off three threads, thus disconnecting the magneto, and the engine stalled. Remedy: replace three-thread electrical cannon plugs with standard ten-thread.

From the same source comes advice to be sure Lockheed Bulletin 112 has been complied with, particularly regarding the horizontal stabilizer spar. There are two holes in the spar, drilled for purpose of jig attachment during initial assembly. These holes were never approved, and are responsible for cracks appearing on nearly all Lodestar and Ventura spars. Remedy: make sure your Lockheed complies with Factory Bulletin 112.